

Srpsko geološko društvo

**Zbornik apstrakata
XVIII Kongres geologa Srbije**



**18 КОНГРЕС
ГЕОЛОГА СРБИЈЕ**

**Book of abstracts
of the XVIII Serbian Geological Congress**

**GEOLOGIJA REŠAVA PROBLEME
GEOLOGY SOLVES THE PROBLEMS**

Divčibare, 01-04. jun 2022.

XVIII Kongres geologa Srbije: Zbornik apstrakata

(Nacionalni kongres sa međunarodnim učešćem)

XVIII Serbian Geological Congress: Book of abstracts

(National Congress with International Participation)

Divčibare, 01-04.06.2022.

Organizator / Organised by

Srpsko geološko društvo / Serbian Geological Society

Suorganizator / Co-organised by

Univerzitet u Beogradu – Rudarsko-geološki fakultet /
University of Belgrade, Faculty of Mining and Geology

Za izdavača / For the Publisher

Vladimir Simić

Predsednik Srpskog geološkog društva / President of the Serbian Geological Society

Glavni urednik / Editor-in-chief

Bojan Kostić

Uređivački odbor / Editorial Board

Danica Srećković-Batočanin, Nevenka Đerić, Dragoljub Bajić

Tehnička priprema / Technical Preparation

Bojan Kostić, Zoran Miladinović, Ana Zeković, Marija Petrović

Izdavač / Publisher

Srpsko geološko društvo / Serbian Geological Society

Kamenička 6, P.Box 227, 11001, Belgrade, Serbia

<http://www.sgd.rs>; e-mail: office@sgd.rs

ISBN-978-86-86053-23-7

Napomena: *Autori su odgovorni za sadržaj i kvalitet svojih saopštenja*

Note: *The authors are responsible for the content and quality of their contributions*

Organizacioni odbor / Organizing Committee

Vladimir Simić (predsednik), Danica Srećković-Batočanin (potpredsednik), Dragoljub Bajić (sekretar), Zoran Miladinović (sekretar), Nevenka Đerić, Nenad Marić, Predrag Cvijić, Danijela Božić, Sonja Đokanović, Bojan Kostić, Nikoleta Aleksić, Stefan Petrović, Nemanja Krstekanić, Maja Maleš, Marija Vuletić, Natalija Batočanin

Naučni odbor / Scientific Committee

Vladimir Simić, Danica Srećković Batočanin, Nevenka Đerić, Dragana Životić, Rade Jelenković, Aleksandar Kostić, Uroš Đurić, Miloš Marjanović, Alena Zdravković, Suzana Erić, Meri Ganić, Uroš Stojadinović, Katarina Bogičević, Dejan Prelević, Jana Štrbački, Vesna Ristić-Vakanjac, Dušan Polomčić, Vesna Cvetkov, Nevena Andrić-Tomašević, Spomenko Mihajlović, Aleksandra Maran-Stevanović, Darko Spahić, Slobodan Radusinović, Lidija Galović, Kristina Šarić, Vesna Matović

Volonteri studenti / Students volunteers

Marija Petrović, Filip Arnaut

Sponzori / Sponsors

Ministarstvo prosvete, nauke i tehnološkog razvoja
Univerzitet u Beogradu – Rudarsko-geološki fakultet
"Jelen Do" Lime & Aggregates - Carmeuse Group
Rudarski institut d.o.o. Beograd
IBIS-INŽENJERING d.o.o. Banja Luka
Geoing Group
GeoProspect d.o.o.
VODAVODA
Knjaz Miloš
Kompanija Simex

PLENARNA PREDAVANJA / PLENARY LECTURES

Zoran Stevanović, Podzemne vode – ključni resurs budućnosti i najbolji indikator stanja životne sredine.

Zoran Stevanović, Groundwater – Key Resource for the Future and Best Indicator of Environmental Status

Oleg Mandić, Stratigrafija i paleogeografija neogena južnog Panonskog bazena.

Oleg Mandić, Neogene stratigraphy and paleogeography of the southern Pannonian basin.

Ivan Dulić, M. Dunčić, G. Bogićević, V. Gajić, S. Teslić, P. Cvijić, J. Sovilj, S. Marjanović, R. Ahmetzjanov, Regionalni naftno-geološki projekti na prostoru Panonskog basena, Dinarida i Karpatobalkanida.

Ivan Dulić, M. Dunčić, G. Bogićević, V. Gajić, S. Teslić, P. Cvijić, J. Sovilj, S. Marjanović, R. Ahmetzjanov, Regional oil and geological projects in the Pannonian Basin, Dinarides and Carpathian Balkan.

PREDAVANJA PO POZIVU / INVITED LECTURES

Nevena Andrić-Tomašević, Dinamika litosfere duž severoistočnog oboda Adrije zabeležena u sedimentnim basenima i magmatskim produktima

Nevena Andrić-Tomašević, Quantifying lithospheric dynamics along the north-eastern margin of Adria using magmatic and sedimentary signals

Dragoljub Bajić, Rešavanje problema odvodnjavanja primenom „fuzzy MCDM“ metoda pri inženjersko-geološkim istraživanjima

Dragoljub Bajić, Solving dewatering problems using fuzzy MCDM Methods for Engineering-geological Surveys

Katarina Bradić Milinović, Otoliti in situ sa teritorije Srbije (stratigrafski, paleoekološki i paleogeografski značaj)

Katarina Bradić Milinović, Otoliths *in situ* from Serbia (stratigraphic, paleoecological and paleogeographical significance)

Miloš Velojić, Geologija hidrotermalnog Cu-Au sistema Čukaru Peki

Miloš Velojić, Geology of the Čukaru Peki hydrothermal Cu-Au system

Violeta Gajić, Sedimentologija gornje krede jednog dela Unutrašnjih Dinarida (zapadna Srbija)

Violeta Gajić, Sedimentology of the Upper Cretaceous within a part of the Internal Dinarides (West Serbia)

Dragana Đurić, Primena SAR interferometrije za određivanje koseizmičkih deformacija: trendovi i dostignuća

Dragana Đurić, SAR interferometry for coseismic displacement determination: trends and achievements

Miloš Marjanović, Analiza odrona u stenskim kosinama: savremeni pristupi

Miloš Marjanović, Rockfalls analysis in rock slopes: state-of-the-art approaches

Aleksandar Pačevski, Nov pristup proučavanju tekstura minerala značajnih za istraživanje rudnih ležišta

Aleksandar Pačevski, New approaches to the study of mineral textures significant for ore deposits exploration

Dejan Radivojević, Evolucija jugoistočnog dela Panonskog basena i njene implikacije

Dejan Radivojević, Evolution of Southeastern part of the Pannonian Basin and its implications

Ranka Stanković, Harmonizacija geopodataka korišćenjem povezanih otvorenih podataka

Ranka Stanković, Harmonization of Geodata Using Linked Open Data

SADRŽAJ / CONTENT

KORELACIJA MAGNETNOG SUSCEPTIBILITETA I SADRŽAJA METALA U FLOTACIJSKOM JALLOVIŠTU

Filip Abramović, Vesna Cvetkov, Aco Ilić, Dragana Životić23

CORRELATION OF MAGNETIC SUSCEPTIBILITY AND CONTENT OF METAL IN FLOTATION TAILINGS

Filip Abramović, Vesna Cvetkov, Aco Ilić, Dragana Životić24

GEOLOŠKE KARAKTERISTIKE LEŽIŠTA ARHITEKTONSKO-GRAĐEVINSKOG (UKRASNOG) KAMENA "VINIČI"-BJELOPAVLICI

Vasilije Abramović, Darko Božović25

GEOLOGICAL CHARACTERISTICS OF DIMENSION STONE FROM THE "VINIČI" DEPOSIT - BJELOPAVLICI

Vasilije Abramović, Darko Božović26

NAFTNO-MATIČNE STENE I NJIHOVA ZRELOST U PODRUČJU BAŠAIDA (PANONSKI BASEN)

Nikoleta Aleksić, Aleksandar Kostić27

PETROLUM SOURCE ROCKS AND THEIR MATURITY IN THE AREA OF BAŠAID (PANNONIAN BASIN)

Nikoleta Aleksić, Aleksandar Kostić28

FORMACIONA ANALIZA GORNJOMIOCENSKO-DONJOPLIOCENSKIH SEDIMENATA PODRUČJA JUGOISTOČNOG BANATA

Filip Anđelković, Dejan Radivojević29

FORMATIONAL ANALYSIS OF UPPER MIOCENE-LOWER PLIOCENE SEDIMENT IN THE SOUTHEASTERN BANAT AREA

Filip Anđelković, Dejan Radivojević30

KASNA FAZA EVOLUCIJE DINARIDA ZABELEŽENA U SEDIMENTNIM BASENIMA I MAGMATSKIM PRODUKTIMA

Nevena Andrić -Tomašević31

LATE-STAGE EVOLUTION OF THE DINARIDES RECORDED IN SEDIMENTARY BASINS AND MAGMATIC PRODUCTS

Nevena Andrić -Tomašević32

PRIMENA JEDNOSTAVNIH METODA PREDVIĐANJA NA PODATKE VERTIKALNOG ELEKTROMETRIJSKOG SONDIRANJA

Filip Arnaut, Vesna Cvetkov, Dragana Đurić33

APPLICATION OF SIMPLE FORECASTING METHODS ON VERTICAL ELECTRICAL SOUNDING DATA

Filip Arnaut, Vesna Cvetkov, Dragana Đurić34

PROJEKAT RAZVOJA MODULARNOG ROBOTSKOG SISTEMA ZA RUDARENJE (ROBOMINERS) I PERSPEKTIVA PRIMENE U SRBIJI

Nebojša Atanacković, Vladimir Živanović, Veselin Dragišić, Sava Magazinović, Predrag Mijatović
.....35

PROJECT OF DEVELOPMENT OF MODULAR ROBOTIC MINING SYSTEM (ROBOMINERS) AND PERSPECTIVE OF APPLICATION IN SERBIA

Nebojša Atanacković, Vladimir Živanović, Veselin Dragišić, Sava Magazinović, Predrag Mijatović 36

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

HIDROGEOLOGIJA LEŽIŠTA BAKRA I ZLATA ČUKARU PEKI – OD ISTRAŽIVANJA DO EKSPLOATACIJE

Nebojša Atanacković, Vladimir Živanović, Veselin Dragišić, Jelena Davidović.....37

HYDROGEOLOGY OF THE ČUKARU PEKI COPPER-GOLD DEPOSIT – FROM EXPLORATION TO EXPLOITATION

Nebojša Atanacković, Vladimir Živanović, Veselin Dragišić, Jelena Davidović.....38

NOV PRISTUP POSREDNOG DEFINISANJA MODULA DEFORMACIJA

Predrag Babić, Uroš Mirković, Slobodan Radovanović39

MATEMATIKA KAO ALAT ZA REŠAVANJE PROBLEMA PRI EKSPLOATACIJI LEŽIŠTA MINERALNIH SIROVINA

Sanja Bajić, Dragoljub Bajić, Branko Gluščević40

MATHEMATICS AS A TOOL FOR SOLVING PROBLEMS IN THE EXPLOITATION OF MINERAL DEPOSITS

Sanja Bajić, Dragoljub Bajić, Branko Gluščević41

REŠAVANJE PROBLEMA ODVODNJAVANJA PRIMENOM „FUZZY-MCDM“ METODA PRI INŽENJERSKO-GEOLOŠKIM ISTRAŽIVANJIMA

Dragoljub Bajić42

SOLVING DEWATERING PROBLEMS USING FUZZY MCDM METHODS FOR ENGINEERING-GEOLOGICAL SURVEYS

Dragoljub Bajić43

KINEMATSKA EVOLUCIJA MEZOZOJSKIH SEDIMENATA PLATO TARE I ZAOVINSKOG JEZERA (ZAPADNA SRBIJA)

Miljan Barjaktarović, Tatjana Vrtikapa, Marica Knežević44

KINEMATIC EVOLUTION OF MESOZOIC SEDIMENTS OF THE TARA PLATEAU AND LAKE ZAOVINE (WESTERN SERBIA)

Miljan Barjaktarović, Tatjana Vrtikapa, Marica Knežević45

O KONTINENTALNIM KARBONATIMA: BIGAR VS. TRAVERTIN

Natalija Batočanin, Ivana Carević, Sanja Manojlović.....46

ABOUT TERRESTRIAL CARBONATES: CALCAREOUS TUFA VS. TRAVERTINE

Natalija Batočanin, Ivana Carević, Sanja Manojlović.....47

HIDROGEOLOŠKE KARAKTERISTIKE TERMOMINERALNE VODE IZVORIŠTA „SEDRA“ KOD BREZE I MOGUĆNOST PRIMJENE

Sabit Begić, Ćazim Šarić, Miodrag Banješević & Marija Kukavica.....48

HYDROGEOLOGICAL CHARACTERISTICS OF THERMOMINERAL WATER OF THE SOURCE "SEDRA" AT BREZA AND POSSIBILITY OF UTILISATION

Sabit Begić, Ćazim Šarić, Miodrag Banješević & Marija Kukavica.....49

EVALUATION OF THE GEOLOGICAL CONTEXT FOR NUCLEAR WASTE DISPOSAL OPTIONS IN SERBIA

Koen Beerten, Koen Lenie, Petar Stejić, Dalibor Arbutina.....50

THERMAL AND SUBTHERMAL KARST WATER IN BULGARIA

Aleksey Benderev, Sava Kolev, Mila Trayanova, Aglaida Toteva.....51

LATE MIOCENE VOLCANISM IN THE TIKVES VALLEY-NORTH MACEDONIA (MRZEN LOCALITY)

Ivan Boev52

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

**MINERALOGICAL BACKGROUND OF ALINCI LOCALITY,
NORTH MACEDONIA**

Ivan Boev, Marko Bermanec.....53

**STRATIGRAFSKA POZICIJA I VULKANOLOŠKE KARAKTERISTIKE ANDEZITA LEŽIŠTA
ČUKARU PEKI**

Dragana Bosić, Vladica Cvetković, Miodrag Banješević, Siyuan Chen, Aleksandar Pačevski,
Kristina Šarić.....54

**STRATIGRAPHY AND VOLCANOLOGICAL CHARACTERISTICS OF THE HOST
ANDESITE OF THE ČUKARU PEKI DEPOSIT**

Dragana Bosić, Vladica Cvetković, Miodrag Banješević, Siyuan Chen, Aleksandar Pačevski,
Kristina Šarić.....55

**GEOTEHNIČKI USLOVI NA UNUTRAŠNEM ODLAGALIŠTU POVRŠINSKOG KOPA
DRMNO I PREDLOZI ZA STABILIZACIJU TERENA**

Danijela Božić.....56

**GEOTECHNICAL CONDITIONS AT THE INTERNAL LANDFILL OF DRMNO OPEN PIT
AND PROPOSALS FOR FIELD STABILIZATION**

Danijela Božić.....57

**STANJE I POTENCIJALNOST TEHNIČKO – GRAĐEVINSKOG KAMENA
JADRANSKO-JONSKE ZONE CRNE GORE**

Darko Božović, Dragan Radulović, Vladimir Simić.....58

**STATE AND POTENTIALITY OF AGGREGATE ROCKS OF THE ADRIATIC-IONIAN
ZONE OF MONTENEGRO**

Darko Božović, Dragan Radulović, Vladimir Simić.....59

**OTOLITI *IN SITU* SA TERITORIJE SRBIJE (STRATIGRAFSKI, PALEOEKOLOŠKI I
PALEOGEOGRAFSKI ZNAČAJ)**

Katarina Bradić-Milinović, Werner Schwarzhans60

**OTOLITHS *IN SITU* FROM SERBIA (STRATIGRAPHIC, PALEOECOLOGICAL AND
PALAEOGEOGRAPHICAL SIGNIFICANCE)**

Katarina Bradić-Milinović, Werner Schwarzhans61

THE AGE AND COMPOSITION OF UPPER CRETACEOUS MAMONIA MÉLANGE, CYPRUS

Nikita Bragina, Liubov Bragina, Efthymios Tsiolakis, Vasilis Symeou.....62

**UPPER CRETACEOUS (CONIACIAN) METALLIFEROUS DEPOSITS OF THE PERAPEDHI
FORMATION IN THE AKAMAS PENINSULA, CYPRUS**

Liubov Bragina, Nikita Bragin, Efthymios Tsiolakis, Vasilis Symeou, Nikolaos Papadimitriou,
Polina Proshina.....63

**VULKANITI KARADORĐEVO FORMACIJE: NOVI PODACI IZ BUŠOTINA U
SREDNJEM BANATU**

Vladica Cvetković, Milena Dunčić, Ivan Dulić, Predrag Cvijić, Dejan Prelević, Kristina Šarić.....64

**VOLCANIC ROCKS OF THE KARADORĐEVO FORMATION: NEW DATA FROM
DRILLHOLES IN MIDDLE BANAT**

Vladica Cvetković, Milena Dunčić, Ivan Dulić, Predrag Cvijić, Dejan Prelević, Kristina Šarić.....65

PERMSKI VULKANITI SEVERNE BAČKE

Vladica Cvetković, Kristina Šarić, Predrag Cvijić, Milena Dunčić, Dejan Prelević.....66

PERMIAN VOLCANIC ROCKS OF NORTHERN BAČKA

Vladica Cvetković, Kristina Šarić, Predrag Cvijić, Milena Dunčić, Dejan Prelević.....67

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

**LEŽIŠTE ARHITEKTONSKO-GRAĐEVINSKOG (UKRASNOG) KAMENA
"TOSPUDE" – CUCE**

Ivan Danilović, Darko Božović.....68

THE DIMENSION STONE DEPOSIT "TOSPUDE" – CUCE

Ivan Danilović, Darko Božović.....69

**GORNJOTRIJASKE ASOCIJACIJE RADIOLARIJA CENTRALNE SRBIJE (OKOLINA
KRAGUJEVCA)**

Nevenka Đerić, Hans-Jürgen Gawlick, Špela Goričan, Bojana Džinić.....70

**LATE TRIASSIC RADIOLARIAN ASSEMBLAGES FROM CENTRAL SERBIA
(KRAGUJEVAC AREA)**

Nevenka Đerić, Hans-Jürgen Gawlick, Špela Goričan, Bojana Džinić.....71

MINERALNO-SIROVINSKI POTENCIJAL LOPARSKOG BASENA

Evica Divković-Golić, Ljubomir Gajić, Dražan Tokanović.....72

MINERAL RAW POTENTIAL OF LOPARE BASIN

Evica Divković-Golić, Ljubomir Gajić, Dražan Tokanović.....73

TREKUTNO STANJE U IZRADI OSNOVNE INŽENJERSKOGEOLOŠKE KARTE SRBIJE

Sonja Đokanović, Đorđe Trbojević, Jasmina Mićević.....74

**CURRENT SITUATION IN THE PREPARATION OF THE BASIC ENGINEERING
GEOLOGICAL MAP OF SERBIA**

Sonja Đokanović, Đorđe Trbojević, Jasmina Mićević.....75

**POTENCIJALNO TOKSIČNI ELEMENTI U OVERBANK SEDIMENTIMA MIKRO BASENA
IZ SEVERNOSTOKA ZAPADNE MORAVE (SRBIJA)**

Božidar V. Đokić, Dragana Vidojević.....76

**POTENTIALLY TOXIC ELEMENTS IN OVERBANK SEDIMENTS OF MICRO BASIN FROM
THE NORTHERN PART OF THE WESTERN MORAVA RIVER (SERBIA)**

Božidar V. Đokić, Dragana Vidojević.....77

**REGIONALNI NAFTNO-GEOLOŠKI PROJEKTI NA PROSTORU PANONSKOG BASENA,
DINARIDA I KARPATO-BALKANIDA**

Ivan Dulić, M. Dunčić, G. Bogićević, V. Gajić, S. Teslić, P. Cvijić, J. Sovilj, S. Marjanović i
R. Ahmetzjanov.....79

**PRIMENA SAR INTERFEROMETRIJE ZA ODREĐIVANJE KOSEIZMIČKIH DEFORMACIJA:
TRENDOVI I DOSTIGNUĆA**

Dragana Đurić.....80

**SAR INTERFEROMETRY FOR COSEISMIC DISPLACEMENT DETERMINATION: TRENDS
AND ACHIEVEMENTS**

Dragana Đurić.....81

GEOFIZIČKA ISTRAŽIVANJA TONJENJA LESA U ZEMUNU

Dragana Đurić, Branislav Sretković, Uroš Đurić, Zoran Radić, Dejan Vučković.....82

GEOPHYSICAL INVESTIGATION OF COLLAPSING LOESS IN ZEMUN

Dragana Đurić, Branislav Sretković, Uroš Đurić, Zoran Radić, Dejan Vučković.....83

**PRVI NALAZ FOSILNE RIBE (ENCHODONTOIDEI, ACTINOPTERYGII) U
KAMENOLOMU STRUGANIKU**

Dragana D. Đurić, Nevenka Đerić, Katarina Bradić-Milinović, Ivana Petrović.....84

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

FIRST RECORD OF FOSSIL FISH (ENCHODONTOIDEI, ACTINOPTERYGII) IN THE STRUGANIK QUARRY

Dragana D. Đurić, Nevenka Đerić, Katarina Bradić-Milinović, Ivana Petrović.....85

FOSSILNI NALAZI BEZNOGIH GUŠTERA (ANGUINAE, SQUAMATA) U PLEISTOCENSKIM LOKALITETIMA SRBIJE

Dragana Đurić, Katarina Bogićević, Draženko Nenadić, Mihailo Jovanović, Aleksandra Savković86

FOSSIL FINDINGS OF LEGLESS LIZARDS (ANGUINAE, SQUAMATA) IN PLEISTOCENE SITES OF SERBIA

Dragana Đurić, Katarina Bogićević, Draženko Nenadić, Mihailo Jovanović, Aleksandra Savković ...87

PRIMENA STRUCTURE FROM MOTION TEHNIKE ZA INŽENJERSKOGEOLOŠKO KARTIRANJE PODZEMNIH PROSTORIJA

Uroš Đurić, Nenad Brodić, Zoran Radić, Dragana Đurić, Miloš Marjanović.....88

APPLICATION OF STRUCTURE FROM MOTION TECHNIQUE FOR ENGINEERING GEOLOGICAL MAPPING OF UNDERGROUND ROOMS

Uroš Đurić, Nenad Brodić, Zoran Radić, Dragana Đurić, Miloš Marjanović.....89

GEOLOSKI VODIČ PLANINARSKE TRANSVERZALE VRANICA-POGORELICA-BITOVNJA

Alojz Filipović, Ivona Filipović90

A GUIDE TO THE GEOLOGY OF VRANICA-POGORELICA-BITOVNJA MOUNTAIN PATHWAY

Alojz Filipović, Ivona Filipović91

SEDIMENTOLOGIJA GORNJE KREDE JEDNOG DELA UNUTRAŠNJIH DINARIDA (ZAPADNA SRBIJA)

Violeta Gajić92

SEDIMENTOLOGY OF THE UPPER CRETACEOUS WITHIN A PART OF THE INTERNAL DINARIDES (WESTERN SERBIA)

Violeta Gajić93

ĐURĐEVAČKI PIJESCI: PRVI REZULTATI DATIRANJA I PRELIMINARNA PALEOGEOGRAFSKA REKONSTRUKCIJA

Lidija Galović, Koen Beerten, Mihajlo Pandurov, Rodoljub Gajić, Petar Stejić, Nina Hećej, Ajka Šorša, Rosa Maria Poch, Stjepan Husnjak94

THE ĐURĐEVAC SANDS: FIRST DATING RESULTS AND PRELIMINARY PALEOGEOGRAPHICAL RECONSTRUCTION

Lidija Galović, Koen Beerten, Mihajlo Pandurov, Rodoljub Gajić, Petar Stejić, Nina Hećej, Ajka Šorša, Rosa Maria Poch, Stjepan Husnjak95

GEODIVERZITET NEGOTINSKE KRAJINE (ISTOČNA SRBIJA): PERSPEKTIVA ZAŠTITE „BUKOVSKO DELTE“

Meri Ganić, Dejan Radivojević.....96

GEODIVERSITY OF NEGOTIN KRAJINA (EASTERN SERBIA): PROTECTION PERSPECTIVE OF „BUKOVO DELTA“

Meri Ganić, Dejan Radivojević.....97

PALEOGEOGRAFIJA PALIČKOG I LUDOŠKOG JEZERA

Tivadar Gaudenyi, Milan Mihajlović98

PALEOGEOGRAPHY OF THE LAKE PALIĆ AND LAKE LUDOŠ

Tivadar Gaudenyi, Milan Mihajlović99

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

DEPOZICIONA ISTORIJA TRIJASKE SPOLJAŠNJE-PREDŠELFNE SEKVENCE HALŠTATSKOG KREČNJAKA SAČUVANE U UNUTRAŠNjim DINARIDIMA SRBIJE

Hans-Jürgen Gawlick, Milan N. Sudar100

DEPOSITIONAL HISTORY OF THE TRIASSIC OUTER SHELF HALLSTATT LIMESTONE SEQUENCE PRESERVED IN THE INNER DINARIDES OF SERBIA

Hans-Jürgen Gawlick, Milan Sudar101

LITOSTRATIGRAFSKE KARAKTERISTIKE PLAVINSKIH DEONATA ČUKOVA (SEVEROZAPADNA SRBIJA)

Bojan Glavaš-Trbić, Slavica Đajić, Monika Mirković, Petar Stejić102

LITOSTRATIGRAPHIC CHARACTERISTICS OF ČUKOVO PROLUVIAL DEPOSITS (NORTHWESTERN SERBIA)

Bojan Glavaš-Trbić, Slavica Đajić, Monika Mirković, Petar Stejić103

GEOLOŠKI STUB ZA SREDNJOBOSANSKO ŠKRILJAVO GORJE (SŠG)

Hazim Hrvatović104

GEOLOGICAL COLUMN FOR THE MID-BOSNIAN SCHIST MTS. (MBSM)

Hazim Hrvatović105

DEFINISANJE STRUKTURNO-TEKTONSKIH ODNOSA KOJI SU UTICALI NA FORMIRANJE NEOGENIH BASENA PRIMENOM MATEMATIČKIH TRANSFORMACIJA

Snežana Ignjatović, Ivana Vasiljević, Dejan Vučković107

APPLICATION OF MATHEMATICAL TRANSFORMATION TO DEFINE STRUCTURAL-TECTONIC CORRELATION AFFECTING THE FORMATION OF NEOGENE BASINS

Snežana Ignjatović, Ivana Vasiljević, Dejan Vučković108

NAFTNI POTENCIJAL LITOSTRATIGRAFSKIH JEDINICA NA PROSTORU OBUDOVAC-BRVNIK

Saša Ivanišević, Petar Skrobonja, Irina Zahirović, Mikhail Kuznetsov, Dejan Radivojević109

OIL POTENTIAL OF LITHOSTRATIGRAPHIC UNITS IN THE OBUDOVAC-BRVNIK AREA

Saša Ivanišević, Petar Skrobonja, Irina Zahirović, Mikhail Kuznetsov, Dejan Radivojević110

RANJIVOSTI PODZEMNIH VODA SJEVEROZAPADNOG DIJELA REPUBLIKE SRPSKE I PRIMJENA CLC BAZE PODATAKA

Dunja Josipović, Petar Begović, Branko Ivanković, Nataša Bajić.....111

GROUNDWATER VULNERABILITY OF THE NORTHWESTERN PART OF REPUBLIC OF SRPSKA AND CLC DATABASE APPLICATION

Dunja Josipović, Petar Begović, Branko Ivanković, Nataša Bajić.....112

GEOLOŠKE KARAKTERISTIKE ARHITEKTONSKO-GRAĐEVINSKOG (UKRASNOG) KAMENA LEŽIŠTA "BRANKOV KRŠ" – CETINJE

Božica Jovanović, Mia Jovanović, Darko Božović.....113

GEOLOGICAL CHARACTERISTICS OF ARCHITECTURAL-BUILDING (ORNAMENTAL) STONE DEPOSIT "BRANKOV KRŠ" – CETINJE

Božica Jovanović, Mia Jovanović, Darko Božović.....114

BIJELI BOKSITI ZAPADNE CRNE GORE KAO NEMETALIČNA MINERALNA SIROVINA

Mia Jovanović, Slobodan Radusinović115

WHITE BAUXITES OF WESTERN MONTENEGRO AS A NON-METALIC MINERAL RESOURCE

Mia Jovanović, Slobodan Radusinović116

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

NAUČNA I EDUKATIVNA VREDNOST LESNIH PROFILA OD STAROG SLANKAMENA DO ZEMUNA

Mladen Jovanović, Tivadar Gaudenyi, Ljupko Rundić.....117

SCIENTIFIC AND EDUCATIONAL VALUES OF LOESS SECTIONS FROM STARI SLANKAMENT TO ZEMUN

Mladen Jovanović, Tivadar Gaudenyi, Ljupko Rundić.....118

BARREMIAN - APTIAN OSTRACODA AND PLANKTONIC FORAMINIFERA OF THE KOKLUK SECTION (E CRIMEA)

Maria Karpuk119

GUTLOVO VRELO U DOLINI VELIKOG RZAVA

Milorad Kličković120

GUTLOVO VRELO KARST SPRING IN THE VELIKI RZAV RIVER VALLEY

Milorad Kličković121

FOSILI SLOVENIJE

Tea Kolar-Jurkovšek, Bogdan Jurkovšek.....122

FOSSILS OF SLOVENIA

Tea Kolar-Jurkovšek, Bogdan Jurkovšek.....123

KONODONTI SLOVENIJE

Tea Kolar-Jurkovšek, Bogdan Jurkovšek.....124

CONODONTS OF SLOVENIA

Tea Kolar-Jurkovšek, Bogdan Jurkovšek.....125

MODEL BASED ASSESSMENT OF URANIUM MIGRATION, DOWNSTREAM OF "ELESHNITSA" TAILINGS POND, BULGARIA

Sava Kolev, Peter Gerginov126

ELEMENTI U TRAGOVIMA I FLUIDNE INKLUZIJE DISTALNIH SKARNOVA RUDNIKA

Bojan Kostić, Danica Srečković-Batočanin & Vesna Matović.....127

TRACE ELEMENTS AND FLUID INCLUSIONS IN DISTAL SKARN ZONE FROM RUDNIK

Bojan Kostić, Danica Srečković-Batočanin & Vesna Matović.....128

KOMPARACIJA METODA XRF I ICP-MS NA UZORCIMA UGLJA I PRODUKATA SAGOREVANJA

Branko Kostić, Dejan Prelević, Sabina Kovač, Ksenija Eraković, Dragana Životić129

COMPARISON OF XRF AND ICP-MS METHODS ON COAL SAMPLES AND COMBUSTION PRODUCTS

Branko Kostić, Dejan Prelević, Sabina Kovač, Ksenija Eraković, Dragana Životić130

INTRODUCTION TO THE IGCP 710 PROJECT: WESTERN TETHYS MEETS EASTERN TETHYS

Michał Krobicki with co-leaders and members of the IGCP 710 Project131

PEPERITES ON THE PIETROS MOUNT (WESTERN CHORNOHORA, UKRAINIAN CARPATHIAN MOUNTAINS)

Michał Krobicki132

ANALOGNO MODELOVANJE TRANSFERA DEFORMACIJA OKO KRUTIH INDENTERA

Nemanja Krstekanić, Ernst Willingshofer, Liviu Matenco, Marinko Toljić, Uroš Stojadinović.....133

ANALOGUE MODELLING OF DEFORMATION TRANSFER AROUND RIGID INDENTERS

Nemanja Krstekanić, Ernst Willingshofer, Liviu Matenco, Marinko Toljić, Uroš Stojadinović.....134

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

CIRKUM-MEZIJSKI RASEDNI SISTEM: STRUKTURA, KINEMATIKA I OROKLINO POVIJANJE KARPATO-BALKANIDA

Nemanja Krstekanić, Liviu Matenco, Ernst Willingshofer, Marinko Toljić, Uroš Stojadinović135

THE CIRCUM-MOESIAN FAULT SYSTEM: STRUCTURE, KINEMATICS AND OROCLINAL BENDING OF THE CARPATHO-BALKANIDES

Nemanja Krstekanić, Liviu Matenco, Ernst Willingshofer, Marinko Toljić, Uroš Stojadinović136

POSTUPCI ISTRAŽIVANJA I OSMATRANJA TECIŠTA

Jelka Krušić, Biljana Abolmasov, Miloš Marjanović137

METHODOLOGY IN MONITORING AND REASEARCH OF DEBRIS FLOWS

Jelka Krušić, Biljana Abolmasov Miloš Marjanović138

NASLAGE KROVINSKOG KVARCNOG PESKA IZ JUŽNOG DELA LEŽIŠTA „TAMNAVA ISTOČNO POLJE“ KAO POTENCIJALNA SIROVINA U PROCESU OTKOPAVANJA LIGNITA

Slobodan Lalatović.....139

ROOF QUARTZ SAND LAYER FROM THE SOUTHERN PART OF THE “TAMNAVA EAST FIELD” DEPOSIT AS A POTENTIAL RAW MATERIAL IN THE LIGNITE EXPLOITATION PROCESS

Slobodan Lalatović.....140

UPOREDNA STATISTIČKA ANALIZA PARAMETARA KVALITETA UGLJA ZA PERIOD OD 2008. DO 2021. GODINE, KAO PODRŠKA U PROCESU HOMOGE-NIZACIJE, LEŽIŠTE UGLJA „POLJE G“, KOLUBARSKI UGLJONOSNI BASEN, SRBIJA

Slobodan Lalatović.....141

CONTINUOUS STATISTICAL ANALYSIS OF COAL QUALITY PARAMETERS FOR THE PERIOD 2008 TO 202, AS SUPPORT IN THE HOMOGENIZATION PROCESS, COAL DEPOSIT “POLJE G”, KOLUBAR COAL BASIN, SERBIA

Slobodan Lalatović.....142

REKONSTRUKCIJA PALEOVEGETACIJE MLAĐEG MIOCENA SRBIJE

Zorica Lazarević, Jelena Milivojević143

RECONSTRUCTION OF THE EARLY MIOCENE PALEOVEGETATION OF SERBIA

Zorica Lazarević, Jelena Milivojević144

METODOLOŠKI PRISTUPI ISPITIVANJU BOKSITA I CRVENIH MULJEVA

Jovana Malbašić, Sava Marković, Marina Lazarov, Aleksandar Pačevski, Slobodan Radusinović, Jovana Orlić, Dejan Prelević145

RESEARCH OF BAUXITES AND RED MUD: METHODOLOGICAL APPROACHES

Jovana Malbašić, Sava Marković, Marina Lazarov, Aleksandar Pačevski, Slobodan Radusinović, Jovana Orlić, Dejan Prelević146

TEKTONSKE I PETROLOŠKE KARAKTERISTIKE SEVERNE SRPSKO-MAKEDONSKE SUBJEDINICE

Maja Maleš, Uroš Stojadinović, Nemanja Krstekanić, Bojan Kostić147

TECTONIC AND PETROLOGICAL FEATURES OF THE NORTHERNSERBO-MACEDONIAN SUBUNIT

Maja Maleš, Uroš Stojadinović, Nemanja Krstekanić, Bojan Kostić148

STRATIGRAFIJA I PALEOGEOGRAFIJA NEOGENA JUŽNOG PANONSKOG BAZENA

Oleg Mandić.....149

NEOGENE STRATIGRAPHY AND PALEO GEOGRAPHY OF THE SOUTHERN PANNONIAN BASIN

Oleg Mandić150

ĐERDAP UNESKO GLOBALNI GEOPARK – U SLICI I REČI

Aleksandra Maran Stevanović151

DJERDAP UNESCO GLOBAL GEOPARK - IN PICTURES AND WORDS

Aleksandra Maran Stevanović152

GEODIVERZITET SRBIJE – ZAŠTO ŠTITITI I ZA KOGA ČUVATI?

Aleksandra Maran Stevanović153

GEODIVERSITY OF SERBIA - WHY TO CONSERVE AND FOR WHOM TO PRESERVE?

Aleksandra Maran Stevanović154

INOVATIVNE TEHNOLOGIJE ZA PROSTORNU KARAKTERIZACIJU NAFTNOG ZAGAĐENJA - FLUORESCENCIJA INDUKOVANA LASERSKI ZRACENJEM (LIF)

Aleksandar Prvanović, Nenad Marić, Zoran Nikić155

PETROLEUM HYDROCARBONS CONTAMINATION - LASER-INDUCED FLUORESCENCE (LIF)

Aleksandar Prvanović, Nenad Marić, Zoran Nikić156

ODREĐIVANJE ZBIJENOSTI NASIPA ZA ODBRANU OD POPLAVA PRIMENOM DCP OPITA

Dragan Marjanović, Branko Ivanković157

DETERMINATION OF FLOOD EMBANKMENT COMPACTION USING DCP TEST

Dragan Marjanović, Branko Ivanković158

ANALIZA ODRONA U STENSKIM KOSINAMA: SAVREMENI PRISTUPI

Miloš Marjanović159

ROCKFALLS ANALYSIS IN ROCK SLOPES: STATE-OF-THE-ART APPROACHES

Miloš Marjanović161

COALS OF SLOVENIA

Miloš Markič163

GEOMAGNETSKA ISTRAŽIVANJA U ENERGETSKIM POLJIMA U SELU DRENAJICI U OKOLINI VALJEVA

Spomenko J. Mihajlović,165

GEOMAGNETIC INVESTIGATIONS IN ENERGY FIELDS IN THE VILLAGE DRENAJICI NEAR VALJEVO

Spomenko J. Mihajlović,166

GEOLOGICAL FACTORS FOR THE FORMATION OF THE CHEMICAL COMPOSITION OF GROUNDWATER IN THE CATCHMENT AREA OF THE MESTA RIVER

Boyka Mihailova, Simeon Valchev, Thomas Kerestedjian, Aleksey Benderev167

POJAVA JUVELIRSKOG KAMENA U ALUVIJALNOM NANOSU VELIKE KOSANICE (LECKI VULKANSKI KOMPLEKS)

Zoran Miladinović168

ALUVIAL PLACER GEMSTONE OCCURRENCE OF THE VELIKA KOSANICA RIVER (LECE VOLCANIC COMPLEX)

Zoran Miladinović169

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

PETROLOGIJA I MIKROPALEONTOLOGIJA DONJE KREDE SKADARSKOG JEZERA (ZONA VISOKOG KRŠA, JUŽNA CRNA GORA)

Mileva Milić, Martin Đaković, Damjan Čađenović, Novo Radulović.....170

PETROLOGY AND MICROPALEONTOLOGY OF LOWER CRETACEOUS LIMESTONES OF SKADAR LAKE (HIGH KARST ZONE, SOUTHERN MONTENEGRO)

Mileva Milić, Martin Đaković, Damjan Čađenović, Novo Radulović.....171

PALEOEKOLOŠKE KARAKTERISTIKE PALINOMORFI IZ TERCIJARNIH SEDIMENATA ŠAMAČKO-ORAŠKE DEPRESIJE

Jelena Milivojević, Ivana Zdravković, Zorica Lazarević172

PALEOECOLOGICAL CHARACTERISTICS OF PALINOMORPHS FROM TERTIARY SEDIMENTS OF THE ŠAMAČKO-ORAŠKA DEPRESSION

Jelena Milivojević, Ivana Zdravković, Zorica Lazarević173

MINERALOGIJA GLINA KOJE SE UPOTREBLJAVAJU ZA PROIZVODNJU GRNČARIJE U RUJIŠTU (RAŽANJ, SRBIJA)

Maja Milošević.....174

MINERALOGY OF CLAY USED FOR POTTERY MANUFACTURE IN RUJIŠTE (RAŽANJ, SERBIA)

Maja Milošević.....175

HIDROGEOLOŠKI POTENCIJAL GRADA DOBOJA U POGLEDU OTVARANJA NOVIH IZVORIŠTA PODZEMNIH VODA ZA VODOSNABDIJEVANJE STANOVNIŠTVA

Nikola Milovanović, Petar Begović176

HYDROGEOLOGICAL POTENTIAL OF THE CITY OF DOBOJ REGARDING THE OPENING NEW GROUNDWATER SOURCES FOR PUBLIC WATER SUPPLY

Nikola Milovanović, Petar Begović177

PRIKAZ PLEISTOCENSKE MALAKOFAUNE IZ CIGLANA JUGOZAPADNE BAČKE

Biljana Mitrović178

REVIEW OF THE PLEISTOCENE MALACOFUNA FROM THE BRICKYARDS OF SOUTHWESTERN BAČKA

Biljana Mitrović179

POKAZATELJI RECENTNE TEKTONSKE AKTIVNOSTI U SPELEOLOŠKIM OBJEKTIMA DŽEVIRINSKE GREDE (ISTOČNA SRBIJA)

Ana Mladenović, Jelena Čalić.....180

EVIDENCE OF RECENT TECTONIC ACTIVITY IN KARST CAVES OF THE NORTHERN PART OF THE DŽEVIRINSKA GREDA RIDGE (EASTERN SERBIA)

Ana Mladenović, Jelena Čalić.....181

MIDDLE-LATE ANISIAN STEPWISE DEEPENING AS RECORDED IN THE BULOG FORMATION IN THE SELJANI AREA, MONTENEGRO

Milica Mrdak, Martin Đaković, Nevenka Đerić, Hans-Jürgen Gawlick, Milan Sudar182

DA LI IMA TRAGOVA EKSPLOZIVNIH ERUPCIJA U ISTOČNOM DELU LECKOG VULKANSKOG KOMPLEKSA?

Emilija Nidžović, Vladica Cvetković, Kristina Šarić.....183

ARE THERE TRACES OF EXPLOSIVE ERUPTIONS IN THE EASTERN PART OF THE LECE VOLCANIC COMPLEX?

Emilija Nidžović, Vladica Cvetković, Kristina Šarić.....184

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

TEKTONOTERMALNA I EKSHUMACIONA ISTORIJA METAMORFNIH STENA ĐUNISKOGR VISA, CENTRALNOG DELA SRPSKO- MAKEDONSKE MASE, SRBIJA Nenad Nikolić, Dragan Milovanović, Timothy Chapman, Luke Milan.....	185
TECTONOTHERMAL AND EXHUMATION HISTORY OF ĐUNIS HIGHLAND OF THE CENTRAL PART OF THE LOWER METAMORPHIC CORE COMPLEX UNIT (SERBO-MACEDONIAN MASSIF, SERBIA) Nenad Nikolić, Dragan Milovanović, Timothy Chapman, Luke Milan.....	186
MACERALNI SASTAV I RANG UGLJA IBARSKOG BASENA Željana Novković, Nevena Andrić -Tomašević, Vladimir Simić, Dragana Životić	187
MACERAL COMPOSITION AND RANK OF COAL FROM THE IBAR BASIN Željana Novković, Nevena Andrić -Tomašević, Vladimir Simić, Dragana Životić	188
UPOREDNI PRIKAZ GEOLOŠKIH KARAKTERISTIKA LEŽIŠTA OPEKARSKE SIROVINE "SELIŠTE" I "LUČINA" KOD STALAČA, SA POSEBNIM OSVRTOM NA KVALITET I MOGUĆNOST PRIMENE U OPEKARSKOJ INDUSTRIJI Sreten Obradović, Vladimir Simić, Đorđe Simić, Milica Radovanović, Radomir Radunović	189
COMPARATIVE PRESENTATION OF GEOLOGICAL CHARACTERISTICS OF DEPOSITS OF BRICK RAW MATERIALS "SELIŠTE" AND "LUČINA" NEAR STALAČ, WITH PARTICULAR REFERENCE TO THE QUALITY AND USAGE POTENTIAL IN THE BRICK INDUSTRY Sreten Obradović, Vladimir Simić, Đorđe Simić, Milica Radovanović, Radomir Radunović	190
ZRINSKA GORA: NA RUBU SAVSKE SUTURNE ZONE Iva Olić, Borna Lužar-Oberiter, Bojan Matoš, Tamara Troškot-Čorbić	191
ZRINSKA GORA: AT THE MARGIN OF THE SAVA SUTURE ZONE Iva Olić, Borna Lužar-Oberiter, Bojan Matoš, Tamara Troškot-Čorbić	192
NOVI PRISTUP PROUČAVANJU TEKSTURA MINERALA ZNAČAJNIH ZA ISTRAŽIVANJE RUDNIH LEŽIŠTA Aleksandar Pačevski.....	193
NEW APPROACH TO THE STUDY OF MINERAL TEXTURES SIGNIFICANT FOR ORE DEPOSITS EXPLORATION Aleksandar Pačevski.....	194
PRIRODNA RANJIVOST KARSTNIH IZDANI SREDNJETRIJASKIH KREČNJAKA U OBLASTI IZMEĐU REKA BISTRICE, UVCA I LIMA Branislav Petrović, Veljko Marinović, Zoran Stevanović.....	195
INTRINSIC VULNERABILITY OF KARST AQUIFERS OF MIDDLE TRIASIC LIMESTONES IN THE AREA BETWEEN BISTRICA, UVAC AND LIM RIVERS Branislav Petrović, Veljko Marinović, Zoran Stevanović.....	196
POREKLO ASOCIJACIJE NI, AG I SN MINERALA U POLIMETALIČNOM LEŽIŠTU RUDNIK Stefan Petrović, Aleksandar Pačevski, Viktor Bertrandson Erlandson , Rade Jelenković.....	197
ORIGIN OF NI, AG AND SN MINERAL ASSOCIATION IN RUDNIK POLYMETALLIC DEPOSIT Stefan Petrović, Aleksandar Pačevski, Viktor Bertrandsson Erlandsson, Rade Jelenković.....	198
STATISTIČKA ANALIZA PODATAKA O KVALITETU UGLJA DELA LEŽIŠTA "RADLJEVO SEVER" Tatjana Petrović Čačić, Aleksandra Vuković, Vladimir Bačanac, Veselin Bakić	199
STATISTICAL ANALYSIS OF COAL QUALITY DATA OF DEPOSIT "RADLJEVO NORTH"	

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

Tatjana Petrović Čačić, Aleksandra Vuković, Vladimir Bačanac, Veselin Bakić200

OSNOVNA HIDROGEOLOŠKA KARTA (OHGK) 100.000, LIST SMEDEREVO

Tanja Petrović Pantić, Mihajlo Mandić, Katarina Atanasković Samolov201

BASIC HYDROGEOLOGICAL MAPS (BHGM) 100.000, SHEET SMEDEREVO

Tanja Petrović Pantić, Mihajlo Mandić, Katarina Atanasković Samolov202

PROCENA NIVOA PRIRODNE OSNOVE U PODZEMNIM VODAMA NA OSNOVU LITOLOGIJE I ANTROPOGENOG PRITISKA NA PRIMERU FRUŠKE GORE

Tanja Petrović Pantić, Katarina Atanasković Samolov, Milan Tomić203

ESTIMATING NATURAL BACKGROUND LEVELS IN GROUNDWATER BASED ON LITHOLOGY AND ANTHROPOGENIC PRESSURE ON THE EXAMPLE OF FRUŠKA GORA EXAMPLE

Tanja Petrović Pantić, Katarina Atanasković Samolov, Milan Tomić204

OSTRAKODE (CRUSTACEA) KAO INDIKATORI (PALEO)EKOLOŠKIH I (PALEO)KLIMATSKIH PROMENA

Jovo Pokrajac, Tamara Karan-Žnidaršič & Ljupko Rundić205

OSTRACODS (CRUSTACEA) AS INDICATORS OF (PALEO)ECOLOGICAL AND (PALEO)CLIMATE CHANGE

Jovo Pokrajac, Tamara Karan-Žnidaršič & Ljupko Rundić206

PRILOG POZNAVANJU PUKOTINSKE IZDANI FORMIRANE U KRISTALASTIM ŠKRILJCIMA I GRANITOIDIMA PLANINSKOG MASIVA KUKAVICE

Ljiljana Popović, Zoran Popović207

CONTRIBUTION TO THE KNOWLEDGE OF FRACTURED AQUIFER FORMED IN THE CRYSTALLINE SCHIST AND GRANITOIDS OF THE MOUNTAIN MASSIF KUKAVICA

Ljiljana Popović, Zoran Popović208

GEOHEMIJSKE KARAKTERISTIKE UZORAKA SA DOMINANTNOM ALUNITSKOM FAZOM IZ LECKO-RADANSKOG VULKANSKOG KOMPLEKSA (SRBIJA)

Maja Poznanović Spahić, Pavle Tančić, Darko Spahić209

GEOCHEMICAL CHARACTERISTICS OF SAMPLES WITH DOMINANT PRESENCE OF ALUNITES FROM THE LECE-RADAN VOLCANIC COMPLEX (SERBIA)

Maja Poznanović Spahić, Pavle Tančić, Darko Spahić210

FORAMINIFERA AND RADIOLARIA FROM THE KANNAVIU FORMATION (UPPER CRETACEOUS, CAMPANIAN, CYPRUS)

Polina Proshina, Liubov Bragina, Nikita Bragin, Efthymios Tsiolakis, Vasilis Symeou, Nikolaos Papadimitriou211

JELEČ GRAD – JOŠ NEPRIZNAT OBJEKAT GEONASLEĐA

Marija Radisavljević, Danica Srećković Batočanin, Vladan Vidosavljević, Irina Kajtez212

JELEČ CASTLE – STILL UNRECOGNIZED GEOHERITAGE OBJECT

Marija Radisavljević, Danica Srećković Batočanin, Vladan Vidosavljević, Irina Kajtez213

EVOLUCIJA JUGOISTOČNOG DELA PANONSKOG BASENA I NJENE IMPLIKACIJE

Dejan Radivojević214

EVOLUTION OF SOUTHEASTERN PART OF THE PANNONIAN BASIN AND ITS IMPLICATIONS

Dejan Radivojević215

SADRŽAJ ELEMENATA RIJETKIH ZEMALJA U TRIJASKIM BOKSITIMA CRNE GORE

Slobodan Radusinović, Mia Jovanović216

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

CONTENT OF RARE EARTH ELEMENTS IN TRIASSIC BAUXITES OF MONTENEGRO

Slobodan Radusinović, Mia Jovanović217

IZVEDENA HIDROGEOLOŠKA ISTRAŽIVANJA ZA POTREBE STABILIZACIJE UNUTRAŠNJEG ODLAGALIŠTA POVRŠINSKOG KOPA „DRMNO“

Marijana Rajković, Dušan Polomčić, Dragoljub Bajić218

HYDROGEOLOGICAL RESEARCH PERFORMED FOR STABILIZATION OF INTERNAL LANDFILL OF “DRMNO” OPEN PIT

Marijana Rajković, Dušan Polomčić, Dragoljub Bajić219

TEKTONSKA EVOLUCIJA SEVEROISTOČNIH DINARIDA

Nikola Randelović, Branislav Trivić, Nemanja Krstekanić, Bojan Kostić, Uroš Stojadinović220

TECTONIC EVOLUTION OF THE NORTH-EASTERN DINARIDES

Nikola Randelović, Branislav Trivić, Nemanja Krstekanić, Bojan Kostić, Uroš Stojadinović221

PRIMENA AUTOREGRESIVNOG MODELA, SIVOG MODELA I BILOT METODE NA IZVORIŠIMA PODZEMNIH VODA

Jelena Ratković, Dušan Polomčić, Zoran Gligorić, Dragoljub Bajić222

APPLICATION OF THE AUTOREGRESSIVE MODEL, GREY MODEL AND BILOT METHOD TO GROUNDWATER SOURCES

Jelena Ratković, Dušan Polomčić, Zoran Gligorić, Dragoljub Bajić223

ZNAČAJ I ULOGA GEOLOŠKOG ZAVODA REPUBLIKE SRPSKE U PROSTORNOM PLANIRANJU I PREVENCIJI HAZARDA I RIZIKA OD KLIZIŠTA

Cvjetko Sandić, Dragan Mitrović, Koviljka Leka224

SIGNIFICANCE AND ROLE OF THE GEOLOGICAL SURVEY OF THE REPUBLIC OF SRPSKA IN SPATIAL PLANNING AND PREVENTION OF LANDSLIDE HAZARD AND RISK

Cvjetko Sandić, Dragan Mitrović, Koviljka Leka225

FIZIČKO-HEMIJSKE I IZOTOPSKE KARAKTERISTIKE TERMALNIH VODA U SLIVU RIJEKE KRIVAJE

Ćazim Šarić, Ferid Skopljak, Izet Žigić & Dinka Pašić-Škripić226

PHYSICAL-CHEMICAL AND ISOTOPIC CHARACTERISTICS OF THERMAL WATERS IN THE KRIVAJA RIVER BASIN

Ćazim Šarić, Ferid Skopljak, Izet Žigić & Dinka Pašić-Škripić227

CEEPUS MREŽA CIII-RS-0038 NA RUDARSKO-GEOLOŠKOM FAKULTETU U BEOGRADU: PREKO DVE DECENIJE DOPRINOSA USAVRŠAVANJU STUDENATA I NASTAVNIKA

Kristina Šarić228

CEEPUS NETWORK CIII-RS-0038 AT THE FACULTY OF MINING AND GEOLOGY, UNIVERSITY OF BELGRADE: MORE THAN TWENTY YEARS OF CONTRIBUTION TO STUDENT AND TEACHER MOBILITY

Kristina Šarić229

REGIONALNI CENTAR ADRIA EIT RAWMATERIALS HUB

Urša Šolc, Meta Dobnikar, Mateja Košir, Alenka Mauko Pranjić, Sibila Borojević Šoštarić, Vječislav Bohanek230

REGIONAL CENTER ADRIA EIT RAWMATERIALS HUB

Urša Šolc, Meta Dobnikar, Mateja Košir, Alenka Mauko Pranjić, Sibila Borojević Šoštarić, Vječislav Bohanek232

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

**GEOLOŠKE KARAKTERISTIKE LEŽIŠTA DOLOMITSKIH MERMERA KAO TEHNIČKO-
GRAĐEVINSKOG KAMENA „STRAŽEVICA“ KOD BATOČINE**

Valentina Simić, Rajko Kondžulović, Dušan Simić, Slobodanka Lazarev, Milan Ljubičić,
Jovana Njegomirović.....234

**GEOLOGICAL CHARACTERISTICS OF DOLOMITE MARBLE DEPOSIT AS TECHNICAL-
BUILDING STONE „STRAŽEVICA“ NEAR BATOČINA**

Valentina Simić, Rajko Kondžulović, Dušan Simić, Slobodanka Lazarev, Milan Ljubičić, Jovana
Njegomirović.....235

**PREZENTACIJA PROJEKTA "ZAŠTITA LEŽIŠTA MINERALNIH SIROVINA KAO OSNOVA
SIGURNOG SNABDEVANJA MINERALNIM SIROVINAMA U EVROPI (SAFEMIN4EUROPE)**

Vladimir Simić, Rade Jelenković, Dragana Životić, Zoran Miladinović, Stefan Petrović, Marija
Petrović.....236

**PRESENTATION OF THE PROJECT "MINERAL DEPOSITS SAFEGUARDING AS A BASIS OF
EUROPE'S MINERAL RAW MATERIALS SAFETY (SAFEMIN4EUROPE)**

Vladimir Simić, Rade Jelenković, Dragana Životić, Zoran Miladinović, Stefan Petrović, Marija
Petrović.....237

GORNJOKREDNI MAGMATIZAM SAVA-VARDAR ZONE

Kristijan Sokol, Dejan Prelević238

UPPER CRETACEOUS MAGMATISM IN THE SAVA VARDAR ZONE

Kristijan Sokol, Dejan Prelević239

**PRIMENA GEOFIZIČKIH ISTRAŽIVANJA ZA REŠAVANJE PROBLEMA PROCURIVANJA
NASUTE ZEMLJANE BRANE**

Branislav Sretković, Dejan Vučković, Dejan Miloševski240

**APPLICATION OF GEOPHYSICAL RESEARCH FOR SOLVING THE PROBLEM OF THE
EARTHFILL DAM LEAKING**

Branislav Sretković, Dejan Vučković, Dejan Miloševski241

**OBDUKCIJA OFIOLITA NA AFRIČKU PLOČU TOKOM SUŽAVANJA TETISA: DOPRINOS
NUMERIČKIH SIMULACIJA**

Nikola Stanković, Vesna Cvetkov , Vladica Cvetković.....242

**OPHIOLITE OBDUCTION ONTO THE AFRICAN PLATE DURING THE NARROWING OF
TETHYS: CONTRIBUTION FROM NUMERICAL SIMULATIONS**

Nikola Stanković, Vesna Cvetkov, Vladica Cvetković.....243

HARMONIZACIJA PODATAKA KORIŠĆENJEM POVEZANIH OTVORENIH PODATAKA

Ranka Stanković.....244

DATA HARMONIZATION USING LINKED OPEN DATA

Ranka Stanković.....245

**FACIJALNE KARAKTERISTIKE BERIJAS – VALENDINA JUŽNOG DELA GETSKE
KARBONATNE PLATFORME (JUGOISTOČNA SRBIJA)**

Jelena Stefanović, Giovanna Della Porta and Dejan Radivojević.....247

**FACIES CHARACTER OF THE BERRIASIAN – VALANGINIAN IN THE SOUTHERN PART OF
THE GETIC CARBONATE PLATFORM (SOUTHEASTERN SERBIA)**

Jelena Stefanović, Giovanna Della Porta and Dejan Radivojević.....248

**PLAVINE VRŠAČKIH PLANINA – EROZIJA I AKUMULACIJA KONTINENTALNE FAZE
SEDIMENTACIJE PLIOCENA I KVARTARA**

Petar Stejić, Tivadar Gaudenji, Danica Popović249

PROLUVIAL FANS OF VRŠAC MOUNTAINS – EROSION AND ACCUMULATION OF THE CONTINENTAL PHASE OF PLIOCENE AND QUATERNARY SEDIMENTATION

Petar Stejić, Tivadar Gaudenyi, Danica Popović250

FUZZY VIKOR PRISTUP: OCENJIVANJE KRITERIJUMA I IZBOR OPTIMALNE ALTERNATIVE ZA UPRAVLJANJE PODZEMNIM VODAMA

Milica Stepanović, Dragoljub Bajić, Dušan Polomčić251

THE FUZZY VIKOR APPROACH: EVALUATION OF CRITERIA AND SELECTION OF THE BEST GROUNDWATER MANAGEMENT ALTERNATIVE

Milica Stepanović, Dragoljub Bajić, Dušan Polomčić252

PREDNOSTI METODA FUZZY OPTIMIZACIJE U ODNOSU NA KLASIČNE METODE KOD REŠAVANJA PROBLEMA ZAŠTITE OD PODZEMNIH VODA

Milica Stepanović, Dragoljub Bajić, Dušan Polomčić253

ADVANTAGES OF FUZZY OPTIMIZATION METHODS OVER CONVENTIONAL APPROACHES TO PROBLEM SOLVING RELATED TO PROTECTION AGAINST GROUNDWATER

Milica Stepanović, Dragoljub Bajić, Dušan Polomčić254

PODZEMNE VODE – KLJUČNI RESURS BUDUĆNOSTI I NAJBOLJI INDIKATOR STANJA ŽIVOTNE SREDINE

Stevanović Zoran.....255

NOVA SAZNANJA O TEKTONSKOJ EVOLUCIJI SAVA ZONE (CENTRALNA SRBIJA)

Uroš Stojadinović, Nemanja Krstekanić, Liviu Matenco, Tamara Bogdanović256

NEW INSIGHTS INTO THE TECTONIC EVOLUTION OF THE SAVA ZONE (CENTRAL SERBIA)

Uroš Stojadinović, Nemanja Krstekanić, Liviu Matenco, Tamara Bogdanović257

MOŽEMO LI VEROVATI PODACIMA? (ZNAČAJ KONTROLE KVALITETA U HIDROHEMIJSKIM ISTRAŽIVANJIMA)

Jana Štrbački258

CAN WE TRUST THE DATA? (THE IMPORTANCE OF QUALITY CONTROL IN HYDROCHEMICAL RESEARCH)

Jana Štrbački259

FORMACIJA ILI GRUPA BULOG? NOVA SAGLEDAVANJA SREDNJO-KASNO ANIZIJSKE DEPOZICIONE ISTORIJE DINARIDA

Milan N. Sudar, Hans-Jürgen Gawlick.....260

BULOG FORMATION OR BULOG GROUP? NEW INSIGHTS IN THE MIDDLE-LATE ANISIAN DEPOSITIONAL HISTORY IN THE DINARIDES

Milan Sudar, Hans-Jürgen Gawlick261

KRISTALOGRAFSKE KARAKTERISTIKE MINERALA TENARDITA I ANKERITA IZ LIBIJE

Pavle Tančić262

CRYSTALLOGRAPHIC CHARACTERISTICS OF THENARDITE AND ANKERITE MINERALS FROM LIBYA

Pavle Tančić263

TUNGSTEN AND URANIUM IN ALLUVIAL SOILS OF THE GRANTCHARITSA DEPOSIT (BULGARIA)

Mihail Tarassov, Eugenia Tarassova, Elena Tacheva, Milen Stavrev264

MATIČNE STENE BADENA SEGEDINSKE DEPRESIJE

Sladana Teslić, Goran Bogičević, Sanja Trifunčević, Vladislav Gajić, Ivan Dulić265

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

BADENIAN SOURCE ROCKS OF SZEGED DEPRESSION

Sladana Teslić, Goran Bogičević, Sanja Trifunčević, Vladislav Gajić, Ivan Dulić266

LABORATORIJSKA ISPITIVANJA MATIČNIH STENA IZ BUŠOTINE POLJA IDOŠ

Sladana Teslić, Velinka Ćurčić, Vladica Milićević, Predrag Cvijić, Miloš Tripković,
Valerija Cingeli267

LABORATORY TESTING OF SOURCE ROCK FROM WELL OF OIL FIELD IDOŠ

Sladana Teslić, Velinka Ćurčić, Vladica Milićević, Predrag Cvijić, Miloš Tripković,
Valerija Cingeli..... 268

GEOLOSKI PROFIL PLANINE AVALE (SEVERNA ŠUMADIJA) - UVID U LITOSTRATIGRAFIJU I TEKTONSKE STRUKTURE

Marinko Toljić, Bojan Glavaš-Trbić, Maja Maleš i Nikola Randelović269

GEOLOGICAL PROFILE ACROSS THE AVALA MT (NORTHERN ŠUMADIJA) – INSIGHT INTO LITHOSTRATIGRAPHY AND TECTONIC STRUCTURES

Marinko Toljić, Bojan Glavaš-Trbić, Maja Maleš and Nikola Randelović270

STRATIGRAFSKI I TEKTONSKI POLOZAJ GORNJOKREDNIH KREČNJAKA RUJEVCA (ZAPADNA SRBIJA)

Marinko Toljić, Bojan Glavaš-Trbić i Danica Srećković-Batočanin271

STRATIGRAPHIC AND TECTONIC SETTING OF THE UPPER CRETACEOUS LIMESTONES OF RUJEVAC (WESTERN SERBIA)

Marinko Toljić, Bojan Glavaš-Trbić and Danica Srećković-Batočanin.....273

DIREKTNI EKONOMSKI EFEKTI VALORIZACIJE MINERALNE SIROVINE IZ RUDNIH LEŽIŠTA

Radule Tošović.....274

DIRECT ECONOMIC EFFECTS OF VALORIZATION OF MINERAL RAW MATERIALS FROM ORE DEPOSITS

Radule Tošović.....275

AKTUELNI FAKTORI PROMENE EKONOMSKE OCENE REZULTATA GEOLOŠKIH ISTRAŽIVANJA I MINERALNIH REZERV I RUDNIH LEŽIŠTA

Radule Tošović.....276

CURRENT CHANGE FACTORS OF ECONOMIC EVALUATION OF GEOLOGICAL EXPLORATION RESULTS AND MINERAL RESERVES OF ORE DEPOSITS

Radule Tošović.....277

PREDNOSTI PRIMENE PROGRAMSKOG JEZIKA „PYTHON” U RAZVOJU HIDROLOŠKIH MODELA

Milan Tucaković, Dragoljub Bajić, Vesna Ristić Vakanjac, Dušan Polomčić278

ADVANTAGES OF PYTHON PROGRAMMING LANGUAGE IN HYDROLOGICAL MODEL DEVELOPMENT

Milan Tucaković, Dragoljub Bajić, Vesna Ristić Vakanjac, Dušan Polomčić279

POSTUPAK ZA 2D LINEARNU INVERZIJU GRAVIMETRIJSKIH PODATAKA - TESTIRANJE I PRIMENA

Ivana Vasiljević, Branislav Sretković, Ivan Dulić, Vladislav Gajić280

METHOD FOR 2D LINEAR INVERSION OF GRAVITY DATA - TESTING AND APPLICATION

Ivana Vasiljević, Branislav Sretković, Ivan Dulić, Vladislav Gajić281

MODELI RASPODELE GUSTINE U NEOGENOM KOMPLEKSU BAČKOG PLATO I NJIHOVA PRIMENA

Ivana Vasiljević, Ivan Dulić, Snežana Ignjatović, Vladislav Gajić.....282

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

DENSITY DISTRIBUTION MODELS FOR NEOGENE COMPLEX OF BAČKA PLATEAU AND THEIR APPLICATION

Ivana Vasiljević, Ivan Dulić, Snežana Ignjatović, Vladislav Gajić.....283

KOORDINISANA MIOCENSKA ROTACIJA U PRAVCU KAZALJKE NA SATU VARDARSKE ZONE I JEDINICE DRINA-IVANJICA

Máté Velki, Emő Márton, Vesna Cvetkov284

COORDINATED MIOCENE CLOCKWISE ROTATION OF THE VARDAR ZONE AND THE DRINA-IVANJICA UNIT

Máté Velki, Emő Márton, Vesna Cvetkov285

GEOLOGIJA HIDROTERMALNOG CU-AU SISTEMA ČUKARU PEKI

Miloš Velojić.....286

THE GEOLOGY OF HYDROTHERMAL CU-AU SYSTEM ČUKARU PEKI

Miloš Velojić.....287

GEOLOŠKE KARAKTERISTIKE I EKONOMSKI ZNAČAJ DOLOMITA OKOLINE ULCINJA

Branko Vilotijević, Darko Božović.....288

GEOLOGICAL CHARACTERISTICS AND ECONOMICAL SIGNIFICANCE OF DOLOMITES AROUND ULCINJ

Branko Vilotijević, Darko Božović.....289

HIDROGEOLOŠKE KARAKTERISTIKE PODRUČJA CERNIČKOG POLJA I KLJUČKE RIJEKE

Petar Vojnović.....290

HYDROGEOLOGICAL CHARACTERISTICS OF THE KLJUČKA RIJEKA AND CERNIČKO POLJE AREA

Petar Vojnović.....291

MIKROELEMENTI U KVARTARNIM SEDIMENTIMA I LIGNITU KOSTOLAČKO-KOVINSKOG UGLJONOSNOG BASENA, ISTOČNA SRBIJA – ODABRANI PRIMERI

Bogoljub Vučković, Biljana Radovanović, Dragana Životić.....292

TRACE ELEMENTS IN QUATERNARY SEDIMENTS AND LIGNITE FROM THE KOSTOLAC-KOVIN COAL BASIN - SELECTED EXAMPLES

Bogoljub Vučković, Biljana Radovanović, Dragana Životić.....293

REZULTATI GEOLOŠKIH ISTRAŽIVANJA LIGNITA KOSTOLAČKO-KOVINSKOG UGLJONOSNOG BASENA – GEOLOŠKE I MORFOSTRUKTURNE KARAKTERISTIKE

Bogoljub Vučković, Biljana Radovanović, Vesna Matić, Lidija Glamočanin, Bogdan Radić, Ksenija Eraković, Dragana Životić294

RESULTS OF GEOLOGICAL EXPLORATIONS OF LIGNITE IN THE KOSTOLAC-KOVIN COAL BASIN - GEOLOGICAL AND MORPHOSTRUCTURAL FEATURES

Bogoljub Vučković, Biljana Radovanović, Vesna Matić, Lidija Glamočanin, Bogdan Radić, Ksenija Eraković, Dragana Životić295

NEW DATA ON THE UPPER ALBIAN AMMONITES FROM THE TOPOLA AREA (CENTRAL SERBIA)

Marija Vuletić, Nevenka Đerić, László Bujtor, Katarina Bogićević, Draženko Nenadić296

NOVI PODACI O GORNJOALBSKIM AMONITIMA OKOLINE TOPOLE (CENTRALNA SRBIJA)

Marija Vuletić, Nevenka Đerić, László Bujtor, Katarina Bogićević, Draženko Nenadić297

HALKANTIT KAO SEKUNDARNI MINERAL BAKRA U LEŽIŠTU ČOKA MARIN, SRBIJA

Alena Zdravković, Aleksandar Pačevski, Predrag Dabić, Periša Živković.....298

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divcibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

CHALCANTHITE AS A SECONDARY COPPER MINERAL IN THE ČOKA MARIN DEPOSIT, SERBIA

Alena Zdravković, Aleksandar Pačevski, Predrag Dabić, Periša Živković.....299

SEDIMENTOLOŠKE KARAKTERISTIKE MIOCENSKIH NASLAGA DONJE TREPČE

Ana Zeković, Violeta Gajić, Ljupko Rundić, Sabina Kovač.....300

SEDIMENTOLOGICAL CHARACTERISTICS OF MIOCENE DEPOSITS OF DONJA TREPČA

Ana Zeković, Violeta Gajić, Ljupko Rundić, Sabina Kovač.....301

ZAŠTITA PODZEMNIH VODA U RAZLIČITIM FAZAMA ISTRAŽIVANJA LEŽIŠTA MINERALNIH SIROVINA

Vladimir Živanović, Nebojša Atanacković302

GROUNDWATER PROTECTION IN DIFFERENT PHASES OF RAW MINERAL DEPOSIT RESEARCH

Vladimir Živanović, Nebojša Atanacković303

PRAURIJA KAO OBJEKAT GEONASLEĐA LEŽIŠTA MAJDANPEK

Periša Živković, Slobodan Živković304

PRAURIJA AS A PART OF GEOHERITAGE OF MAJDANPEK MINERAL DEPOSIT

Periša Živković, Slobodan Živković305

POTENCIJALNO TOKSIČNI ELEMENTI U OVERBENK SEDIMENTIMA MIKRO BASENA IZ SEVERNOG DELA TOKA ZAPADNE MORAVE (SRBIJA)

Božidar V. Đokić¹, Dragana Vidojević²

¹Geološki zavod Srbije, Beograd, Rovinjska 12, ²Agencija za zaštitu životne sredine,
Beograd, Žabljačka 10a, E-mail: bozidar.djokic@gzs.gov.rs

Ključne reči: potencijalno toksični elementi, overbenk sedimenti

Potencijalno toksični elementi (PTE) mogu da budu veoma zastupljeni u overbenk sedimentima. Overbenk sedimenti su plavni sedimenti nastali u uslovima viših energija reljefa, a taloženi u blizini ušća manjeg sa većim tokom. PTE su veoma migrativni, pa lako mogu da dospeju u hidrosferu i biotu, odnosno lanac ishrane. Ovi elementi iz overbenk sedimenata, pri svim narednim poplavama mogu da se remobilizuju i da ponovo postanu izvor kontaminacije. Overbank sedimenti mogu da vode poreklo i iz stena - geološke podloge. Vodotokovi nekada imaju osobine bujičnih tokova, što može da prouzrokuje mešanja PTE iz overbenk sedimenata. Zemljište je sredina u kome se deponuju overbenk sedimenti, pa ono i na ovaj način predstavlja veoma složen sistem podlozan izmenama. Ne postoje sistematizovani podaci o prisustvu i koncentraciji PTE u overbenk sedimentima iz severnog dela slivu Zapadne Morave, koji je gusto naseljen deo Srbije. Cilj rada je da se analizira ukupna koncentracija PTE u overbenk sedimentima i utvrdi njihovo poreklo (antropogeno ili geogeno - pod uticajem geološke podloge), ili zajedničko (sinergija) iz oba izvora. U radu su analizirane koncentracije 7 potencijalno toksičnih elementa u overbenk sedimentima 19 mikro basena ukupne površine 3090,71 km². Ove mikrobasene dreniraju sledeći vodotokovi: Karačica, Rakovica, Užički potok, Konjska reka, Bratešina, Sušica, Buljski potok, Bjelica, Moravica, Skrapež, Godljevača, Tmuša, Rzav, Mali Rzav, Tučkova reka, Papratiška reka, Despotovica, Dičina i Čemernica. Koordinate prikupljenih uzoraka određene su pomoću uređaja za globalno pozicioniranje (GARMIN-GPSmap60CSx). Uzimanje uzoraka (površinski i na dubini 75-100 cm) vršeno je sondom sa nastavkom za oprobavanje zemljišta i ašovom sa sečivom od nerđajućeg čelika. Pripremljeni uzorci hemijski su analizirani i to arsen, kadmijum, bakar, olovo, nikl i cink spektrometrijskom metodom u indukovanu spregnutoj plazmi (ICP-MS), a hrom rendgenskom fluorescentnom analizom (XRF).

Prosečan sadržaj i medijana PTE u overbenk sedimentima gornjih nivoa su: As - 18.92 (11.8), Co - 48.44 (39.20), Cr - 547.25 (346.10), Cu - 44.93 (43.00), Pb - 53.38 (29.90), Zn - 125.61 (72.00) i Cd - 0.3 (0.24) mg/kg. Polovina sadržaja PTE je u sledećem rasponu: As (16.50-7.40), Co (59.50-22.60), Cr (828.60-163.90), Cu (53.30-27.50), Pb (40.60-23.10), Zn (90.50-63.20) i Cd (0.30-0.15) mg/kg. Arsen, olovo, cink i kadmijum dostižu ekstremno visoke koncentracije u sedimentima Despotovice. Pored sedimenata Despotovice, arsen ove koncentracije dosiže i u sedimentima Dičine, a olovo, kadmijum i cink u sedimentima Buljskog potoka. Netipične koncentracije (outliers) kobalt i hrom dostižu u sedimentima Užičkog potoka i Konjske reke. Kobalt ove sadržaje dostiže i u sedimentima Bratešine, a bakar Moravice. Prosečan sadržaj i medijana PTE u overbenk sedimentima donjih nivoa su As - 23.81 (12.50), Co - 40.88 (28.65), Cr - 343.78 (188.80), Cu - 22.17 (18.30), Pb - 60.19 (23.55), Zn - 101.43 (77.50) i Cd - 0.38 (0.17) mg/kg. Polovina sadržaja PTE u sledećem je rasponu As (45.08-7.83), Co (45.18-19.80), Cr (491.35-118.10), Cu (26.60-12.25), Pb (31.25-22.23), Zn (90.45-69.50) i Cd (0.40-0.10) mg/kg. Olovo, cink i kadmijum pokazuju ekstremno visoke koncentracije u sedimentima Despotovice, a kobalt Bratešine. Netipične (outliers) sadržaje kobalt dostiže kod Bratešine, a bakar u sedimentima Despotovice. Uprkos lokalno konstatovanim povećanim koncentracijama analiziranih PTE, donošenje jednoznačnih zaključaka na osnovu dosadašnjih istraživanja veoma otežava i komplikuje geološka podloga na kojoj su razvijeni sedimenti. Geološki sastav basena može da predstavlja izvor PTE. Vodotokovi koji formiraju mikrobasene često su i bujični što može da utiče i na mešanja materijala. Realna je pretpostavka da je arsen u sedimentima slivova Despotovice, Dičine i Čemernice; kao i olovo, cink i kadmijum u slivu Despotovice antropogenog porekla (poreklo - jalovište). Antropogenog su porekla verovatno i povećane koncentracije bakra u Moravici, hroma u Užičkom potoku i Konjskoj reci (pesticidi, đubriva i vode koje se koriste za navodnjavanje). Poreklo kobalta u Užičkom potoku, Konjskoj reci i Bratešini je iz geološke podloge odnosno bazičnih magmatskih stena. Povećane koncentracije teških metala u nižim (donjim) nivoima, predstavljaju anomalije koje mogu biti i indikatori za ležišta mineralnih sirovina.

POTENTIALLY TOXIC ELEMENTS IN OVERBANK SEDIMENTS OF MICRO BASIN FROM THE NORTHERN PART OF THE WESTERN MORAVA RIVER (SERBIA)

Božidar V. Đokić¹, Dragana Vidojević²

¹Geological Survey of Serbia, Beograd, 12 Rovinjska Street, ²Serbian Environmental Protection Agency, Beograd, 10a Žabljačka Street
E-mail: bozidar.djokic@gzs.gov.rs

Keywords: potentially toxic elements, overbank sediments

Potentially toxic elements (PTE) can have significant concentrations in overbank sediments. Overbank sediments are flood sediments formed in conditions of higher relief energies and deposited near the mouth of a smaller one with a higher flow. PTEs are very migratory, so they can easily reach the hydrosphere and biota, ie the food chain. These elements from the overbank sediments, in all subsequent floods, can be remobilized and become a source of contamination again. Overbank sediments can also originate from rocks - geological substrates. Watercourses sometimes have the characteristics of torrents, which can cause the mixing of PTE from overbank sediments. Soil is an environment in which overbank sediments are deposited, so in this way, it represents a very complex system subject to change.

There are no systematized data on the presence and concentration of PTE in overbank sediments from the northern part of the West Morava basin, a densely populated part of Serbia.

The aim is to analyze the total concentration of PTE in overbank sediments and determine their origin (anthropogenic or geogenic - under the influence of geological substrate) or common (synergy) from both sources.

The paper analyzes the concentrations of seven potentially toxic elements in the overbank sediments of nineteen micro-basins with a total area of 3,090.71 km². These basins are drained by the following watercourses: Karačica, Rakovica, Užice stream, Konjska river, Bratešina, Sušica, Buljski stream, Bjelica, Moravica, Skrapež, Godljevača, Tmuša, Rzav, Mali Rzav, Tučkova river, Papratiška river, Despotovica river, Dičina and Čemernica.

The coordinates of the collected samples were determined using a global positioning device (GARMIN-GPSmap60CSx). Sampling (at a 75-100 cm) was performed with a soil sampling attachment and a stainless-steel spade.

The prepared samples were chemically analyzed, namely arsenic, cadmium, copper, lead, nickel and zinc by the spectrometric method in induced coupled plasma (ICP-MS), and chromium by X-ray fluorescence analysis (XRF).

The average content and median of PTE in upper-level of overbank sediments are: As - 18.92 (11.8), Co - 48.44 (39.20), Cr - 547.25 (346.10), Cu - 44.93 (43.00), Pb - 53.38 (29.90), Zn - 125.61 (72.00) and Cd - 0.38 (0.24) mg/kg. Half of the PTE contents are in the following range: As (16.50-7.40), Co (59.50-22.60), Cr (828.60-163.90), Cu (53.30-27.50), Pb (40.60-23.10), Zn (90.50-63.20), and Cd (0.30-0.15) mg/kg. In extreme concentrations, lead, zinc, and cadmium occur in Buljski stream and Despotovica, and arsenic in Despotovica and Dičina. Outliers of chromium and cobalt are in the upper sediments of the Užice stream and the Konjska River, cobalt also in Bratešina, and copper only in the Moravica sediments.

The average content and median PTE in the overbank sediments of the lower layers are As - 23.81 (12.50), Co - 40.88 (28.65), Cr - 343.78 (188.80), Cu - 22.17 (18.30), Pb - 60.19 (23.55), Zn - 101.43 (77.50) and Cd - 0.38 (0.17) mg/kg. Half of the PTE content is in the next range: As (45.08-7.83), Co (45.18-19.80), Cr (491.35-118.10), Cu (26.60-12.25), Pb (31.25-22.23), Zn (90.45-69.50) and Cd (0.40-0.10) mg/kg. Lead, zinc, and cadmium show extremely high concentrations in the lower levels of sediments at Despotovica and the cobalt of Bratešina. Outliers are chromium at Bratesina and copper at Despotovica.

Despite the locally observed increased concentrations of analyzed PTE, drawing unambiguous conclusions about their origins based on previous research is very difficult and complicated by the

18. Kongres geologa Srbije "Geologija rešava probleme", Divčibare, 01-04 jun 2022. 18 th Serbian Geological Congress "Geology solves the problems", Divčibare, June 01 st -04 th 2022.	Zbornik apstrakata Book of abstracts
--	---

geological basis on which the sediments were developed. The geological composition of the basin can be a source of PTE. Watercourses that form micro-basins are often torrential, which can affect the mixing of materials.

It is a realistic assumption that arsenic in the sediments of the Despotovica, Dičina and Čemernica basins, as well as lead, zinc and cadmium in the Despotovica basin, are certainly of anthropogenic origin (tailings pond). Increased concentrations of copper in Moravica chromium in Užički stream and Konjska river are probably of anthropogenic origin (source is pesticides, fertilizers and water used for irrigation). The origin of cobalt in Užički stream, Konjska river and Bratešina is from the geological base (igneous rocks).

Increased concentrations of heavy metals in lower levels are anomalies that can be indicators of mineral deposits.