

МАКЕДОНСКО ГЕОЛОШКО ДРУШТВО СКОПЈЕ 1952
MACEDONIAN GEOLOGICAL SOCIETY SKOPJE 1952

5^{-ти} КОНГРЕС / 5^{-th} CONGRESS

на / of the

Геолозите на Република Северна Македонија
Geologists of the Republic of North Macedonia

КНИГА НА ПРОШИРЕНИ АПСТРАКТИ
BOOK OF EXTENDED ABSTRACTS



Уредници / Editors:

Серафимовски, Т. & Боев, Б.
Serafimovski, T. & Boev, B.

Охрид, 2024 / Ohrid, 2024

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ПРЕДГОВОР

Почитувани гости, колеги геолози и љубопитни души,

Добредојдовте на 5-тиот Конгрес на геолозите на Република Северна Македонија - интелектуално патување кое ги надминува границите, епохите и карпестите формации. Додека сите ние се собираме под знамето на минатата историја на Земјата и нејзината сегашност која постојано се развива, да тргнеме на патување кое ги обединува науката, “чудата” и откритијата.

Љубопитноста е она што не води и во исто време таа е и нашето наследство.

Геолошкиот конгрес е местото каде идеите би можеле да се судрат како тектонски плочи, предизвикувајќи сеизмички промени во разбирањето. Нашиот Конгрес не е само социјално дружење туку во 2024 тој е раскрсница на дисциплини. Момент кога треба да размислуваме не само за старите седиментни слоеви, туку и за итните предизвици на нашето време: климатските промени, недостигот на ресурси и деликатниот танц помеѓу човештвото и природата. Ако порано се трудеме со релативните методи да ги истражуваме и дешифрираме “тајните” пораки врежани во минералите и фосилите, денес во нашите лаборатории зујат спектрометри, а над нас летаат дрoнови со опции за термичка обработка на податоци, картирање и 3D моделирање. Тоа се денес алатките на модерната геологија.

Нашиот Конгрес не е само за карпи и минерали, туку всушност се работи за луѓе. Геолозите од секое катче на нашата држава и поширокото опкружување, без разлика дали се облечени во теренски чевли или во лабораториски мантили, на ова место се спојуваат и споделуваат. Споделуваме податоци, разменуваме приказни и поттикнуваме соработки. Во светлите

PREFACE

Dear guests, fellow geologists and curious souls,

Welcome to the 5th Congress of Geologists of the Republic of North Macedonia - an intellectual journey that transcends borders, eras and rock formations. As we all gather under the banner of Earth's past history and its ever-evolving present, let us embark on a journey that unites science, "wonders" and discoveries.

Curiosity is what guides us and at the same time it is our heritage.

A geological congress is where ideas could collide like tectonic plates, causing seismic shifts in understanding. Our Congress is not only a social meeting, but in 2024 it is a crossroads of disciplines. A moment when we should think not only about the old sedimentary layers, but also about the urgent challenges of our time: climate change, the scarcity of resources and the delicate dance between humanity and nature. If earlier we tried with relative methods to research and decipher the "secret" messages engraved in minerals and fossils, today spectrometers buzz in our laboratories, and drones fly above us with options for thermal data processing, mapping and 3D modeling. These are the tools of modern geology today.

Our Congress is not just about rocks and minerals, it's really about people. Geologists from every corner of our state and the wider environment, regardless of whether they are wearing field shoes or lab coats, come together and share in this place. We share data, exchange stories and foster collaborations. In the bright halls of the convention center, continents collide and ideas crystallize.

As we gather for fellowship together, remember: The Earth Atlas remains unfinished. There are peaks unclimbed, faults unknown and mysteries lurking beneath ocean trenches. Our task is to fill in those blanks—to map not only

али на конгресниот центар, континентите се судираат и идеите се кристализираат.

Додека се собираме за заедничка дружба, запомнете: Земјиниот атлас останува недовршен. Има врвови неискачени, раседи непознати и мистерии кои демнат под океанските ровови. Наша задача е да ги пополниме тие празни места - да ги картираме не само геолошките форми, туку и нашата издржливост и надеж за опстојување во се покомплексното глобално опкружување. Да се сплотиме во таа долгорочна и постојана експедиција. Без разлика дали сте искусен геолог или само геолог почетник чија љубопитна душа со чудење гледа во планините, овој Конгрес ве поканува. Да истражуваме, да дебатираме и да не оставиме недоречености. Ајде заедно да го напишеме следното поглавје на Земјата. Нека науката и љубопитноста бидат нашиот геолошки компас.

Ве поздравуваме со пораката “Ајде да истражуваме подлабоко и пошироко - заедно“

**Претседател на Македонско
Геолошко друштво:**

Академик Проф. д-р Блажо Боев

geological forms, but also our resilience and hope for survival in an increasingly complex global environment. Let's unite in that long-term and permanent expedition. Whether you are an experienced geologist or just a novice geologist whose curious soul gazes at the mountains with wonder, this Congress invites you. Let's research, debate and leave no ambiguity. Let's write Earth's next chapter together. Let science and curiosity be our geological compass.

We welcome you with the message "let's explore deeper and wider – together"

President of the Macedonian Geological Society:

Academic Prof. d-r. Blazo Bоеv

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Improvement of education through the cooperation between CEEPUS EURO Geo-Sci network and scientific projects: examples from UB-FMG

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INTRODUCTION

The progress of a society is most closely related to the synergy of science and higher education, which must be continuously developed and complemented. Bearing in mind that educational systems change slowly, because they are molded into curricula and accreditation cycles, it is extremely important to find a way for new knowledge derived from cutting edge scientific endeavours to flow into education streams without any obstacle. One example of the synergy of education and science is the cooperation of the educational CEEPUS network CIII-RS-0038: "Earth-Science Studies in Central and South-Eastern Europe (EURO Geo-Sci)" with the scientific projects RECON TETHYS, DEMONITOR, TMCmode and REASONING, all implemented at the University of Belgrade - Faculty of Mining and Geology (UB-FMG). A diversity of geoscientific topics of the mentioned projects guarantees the efficient incorporation of a wide spectra of different geological disciplines into EURO GeoSci activities.

WHAT ARE CEEPUS, RECON TETHYS, DEMONITOR, TMCmod AND REASONING?

CEEPUS (Central European Exchange Program for University Studies) is an educational program which includes 15 countries and Kosovo, and which is based on students' and teachers' mobilities [1]. The network EURO Geo-Sci is a 25 years lasting network between 19 faculties from 11 countries: Albania, Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Hungary, Poland, Romania, Serbia /network coordinator/, Slovakia and Slovenia) [2, 3, and references therein]. The main aim of EURO Geo-Sci is to maintain high standards of education in fundamental and applied geological disciplines, using the Alpine-Dinaride-Carpathian-Balkan geological entity as a key study area. EURO Geo-Sci network is created

with an idea that students who are today using the network for their development and promotions are those experts in the future who will solve important regional and global geological issues; such as (among many others), the preservation of drinking water, environmental problems (pollutions, global warming), discovering and exploitation of new mineral resources, developing of green technologies, working on various geo-hazards (earthquakes, landslides, floods) or the protection of natural and cultural heritage [4].

Four scientific projects financed by different programs of the Science Fund of the Republic of Serbia are RECON TETHYS (Ideas) and DEMONITOR, TMCmod and REASONING (Prism). (1) RECON TETHYS: "Reconstruction of the Tethys' waning in the Balkans" addresses magmatic, sedimentary and basement formations of the Sava-Vardar zone in order to constrain the timing, origin, geodynamic environment and life span of the alleged Cretaceous Sava Ocean, more precisely to answer the question whether the Sava Zone represents a relic of the Neo-Tethyan Ocean that closed during the Late Cretaceous or delimits a diffuse tectonic boundary between earlier collided Gondwana-related block(s) and Europe along with a system of pull-apart basins in a transtensional tectonic environment. (2) DEMONITOR: "Devils' town Erosion MONITORing" is dedicated to determining the erosion rate and stability of specific landforms occurring in south Serbia, which might become fragile in the changing climate (looking into the past and future of these natural wonders); (3) TMCmod: "Geodynamics of basins above subducted slabs: an integrated modelling study of tectonics, sedimentation, and magmatism in the Timok Magmatic Complex" focuses on better understanding the interplay between geodynamic processes in the basin-hosting Timok Magmatic Complex (TMC),

which is part of the larger Late Cretaceous Apuseni-Banat-Timok-Srednogorie (ABTS) magmatic and metallogenic belt, formed in response to the subduction of Mesozoic Neotethys beneath the Carpatho-Balkanides of south-eastern Europe [5]. (4) REASONING: "Characterisation and technological procedures for recycling and reusing of the Rudnik mine flotation tailings" is aimed at characterising in sufficient detail the tailings of the "Rudnik" mine with focus on the content of different economically interesting elements, such as Pb, Zn, Cu, Au, Ag, Bi, W, REE, PGE, selected critical minerals as well as to define new procedures and technological solutions which will enable recycling and reusing of part of the flotation tailings.

INTEGRATING 'HOT' SCIENCE INTO THE EDUCATIONAL SYSTEM

We have already implemented the first cycle of the staff and student exchange between UB-FMG and University of Zagreb – Faculty of Science in the frame of RECON TETHYS activities. PhD student Iva Olić from Zagreb visited Belgrade. She presented her PhD topic related to Upper Cretaceous magmatism in Croatia and Bosnia and Herzegovina and started to prepare her samples for additional analyses. All her activities in Belgrade have been supervised by Prof. Dejan Prelević; the supervision continued in Zagreb when Prof. Prelević used a CEEPUS mobility grant for giving a teaching and training course in Upper Cretaceous magmatism in the Sava-Vardar zone.

Another example is the active incorporation of DEMONITOR into curriculum of EURO Geo-Sci through the mobilities of two BSc. students – Anida Hrvic and Bruno Šuvalić from University of Tuzla – Faculty of Mining, Geology and Civil Engineering. They spent one month at UB-FMG and obtained a short training in the frame of DEMONITOR with Prof. Miloš Marjanović, with a plan to transfer this knowledge and experience with the colleagues from Tuzla.

TMCmod and REASONING projects, led by Prof. Stojadinović and Prof. Simić respectively, are ready to serve EURO Geo-Sci in school year 2024/25 through field and laboratory work in which CEEPUS applicants will participate.

CONCLUSION

Through the presented small example of integrating science into the existing higher educational curriculum, EURO Geo-Sci underlines the significance of using every opportunity to open the educational system for adopting newly governed scientific information. The CEEPUS participating units (faculties and universities) should find a way to give special credits for students who use their mobilities for trainings and professional development through the specialized projects available for the network. Such activities should be also recognized and supported by the Central CEEPUS Office as well.

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