

# Glauconite formation in a palaeosol as an indicator of the incipient sea-level rise: case study of the Zlatni rt, Istria, Croatia

---

Perković, Ivor; Durn, Goran; Cvetko Tešović, Blanka; Škapin, Srečo D.; Matešić, Darko; Vlahović, Igor; Martinuš, Maja

Source / Izvornik: **Abstracts book / 36th International Meeting of Sedimentology, 2023, 415 - 415**

Conference paper / Rad u zborniku

Publication status / Verzija rada: **Published version / Objavljena verzija rada (izdavačev PDF)**

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:169:183656>

Rights / Prava: [In copyright](#) / [Zaštićeno autorskim pravom.](#)

Download date / Datum preuzimanja: **2024-11-04**



Repository / Repozitorij:

[Faculty of Mining, Geology and Petroleum Engineering Repository, University of Zagreb](#)





36<sup>TH</sup>



IAS

DU  
BROV  
NIK

MEETING OF SEDIMENTOLOGY

ABSTRACTS BOOK



12-16 June 2023, DUBROVNIK, CROATIA

**36<sup>th</sup> International Meeting of Sedimentology**  
**June 12–16, 2023, Dubrovnik, Croatia**

# ABSTRACTS BOOK



## Organized by:

Croatian Geological Society (HGD) and International Association of Sedimentologists (IAS)



## Organizing Committee

Lara Wacha, **chair**, *Croatian Geological Survey, Zagreb*  
Katarina Gobo, *University of Zagreb, Faculty of Science*  
Nikolina Ilijanić, *Croatian Geological Survey, Zagreb*  
Tvrtko Korbar, *Croatian Geological Survey, Zagreb*  
Marijan Kovačić, *University of Zagreb, Faculty of Science*  
Duje Kukoč, *Croatian Geological Survey, Zagreb*  
Borna Lužar-Oberiter, *University of Zagreb, Faculty of Science*  
Maja Martinuš, *University of Zagreb, Faculty of Science*  
Slobodan Miko, *Croatian Geological Survey, Zagreb*  
Davor Pavelić, *University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering*  
Kristina Pikelj, *University of Zagreb, Faculty of Science*  
Igor Vlahović, *University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering*

## Scientific Committee

Igor Vlahović, **president**, *University of Zagreb, Croatia*  
Nevena Andrić Tomašević, *Karlsruhe Institute of Technology, Germany*  
Bruno Campo, *University of Bologna, Italy*  
Sonia Campos Soto, *Complutense University of Madrid, Spain*  
Luca Caracciolo, *FAU Erlangen-Nürnberg, Germany*  
Blanka Cvetko Tešović, *University of Zagreb, Croatia*  
Shahin E. Dashtgard, *Simon Fraser University, Canada*  
Andrea Di Capua, *National Research Council – IGAG, Italy*  
Goran Durn, *University of Zagreb, Croatia*  
Gianluca Frijia, *University of Ferrara, Italy*  
Massimiliano Ghinassi, *University of Padova, Italy*  
Luis Gibert Beotas, *University of Barcelona, Spain*  
Bosiljka Glumac, *Smith College, USA*  
Antun Husinec, *St. Lawrence University, USA*  
Stuart Jones, *Durham University, UK*  
Tvrtko Korbar, *Croatian Geological Survey, Croatia*  
Marijan Kovačić, *University of Zagreb, Croatia*  
Juan Carlos Laya, *Texas A&M University, USA*  
Marta Marchegiano, *University of Granada, Spain*  
Cole McCormick, *Pennsylvania State University, USA*  
Mardi McNeil, *Geoscience Australia, Australia*  
Theresa Nohl, *University of Vienna, Austria*  
Shuxin Pan, *PetroChina – NWGI, China*  
Guido Pastore, *University of Milano–Bicocca, Italy*  
Maximiliano Paz, *University of Saskatchewan, Canada*  
Daniel A. Petráš, *Czech Geological Survey, Czech Republic*  
Miquel Poyatos-Moré, *Universitat Autònoma of Barcelona, Spain*  
Joanna Pszonka, *Polish Academy of Sciences – MEERI, Poland*  
John J.G. Reijmer, *Vrije Universiteit Amsterdam, The Netherlands*  
Valentina Marzia Rossi, *National Research Council – IGG, Italy*  
Arnoud Sloopman, *Colorado School of Mines, USA*  
Miroslaw Slowakiewicz, *University of Warsaw, Poland*  
Thomas Steuber, *Khalifa University of Science and Technology, Abu Dhabi, UAE*  
Finn Surlyk, *University of Copenhagen, Denmark*  
Michal Šujan, *Comenius University in Bratislava, Slovakia*  
Romain Vaucher, *University of Geneva, Switzerland*  
Alan Vranjković, *INA Oil Company, Croatia*  
Lara Wacha, *Croatian Geological Survey, Croatia*  
Guodong Wang, *PetroChina, China*  
Pujun Wang, *Jilin University, China*  
Valentin Zuchuat, *RWTH Aachen University, Germany*  
Nadja Zupan Hajna, *Research Centre of the Slovenian Academy of Sciences and Arts, Slovenia*

**Publisher:** Croatian Geological Society (HGD)

**For the publisher:** Slobodan Miko

**Editors:** Igor Vlahović and Darko Matešić

**Language Editor:** Julie Robson (Scotland, United Kingdom)

**Digital layout:** Laser Plus d.o.o

**Cover design:** Ana Badrić

**eISBN:** 978-953-6907-79-3

**Theme 12. Stratigraphic markers and archives****Special Session 12.6.** Paleosols as valuable records of terrestrial climate and environments

Oral presentation

# Glauconite formation in a palaeosol as an indicator of the incipient sea-level rise: case study of the Zlatni rt, Istria, Croatia

Ivor Perković<sup>1</sup>, Goran Durn<sup>1</sup>, Blanka Cvetko Tešović<sup>2</sup>, Srečo D. Škapin<sup>3</sup>, Darko Matešić<sup>1</sup>, Igor Vlahović<sup>1</sup>, Maja Martinuš<sup>2</sup><sup>1</sup>University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering, Zagreb Croatia<sup>2</sup>University of Zagreb, Faculty of Sciences, Zagreb, Croatia<sup>3</sup>Jožef Stefan Institute, Advanced Materials Department, Ljubljana, Slovenia[ivor.perkovic@rgn.hr](mailto:ivor.perkovic@rgn.hr)

Glauconite is usually found as a replacement of bioclasts and faecal pellets through neof ormation and replacement of iron rich smectite in deepwater environments on the shelf-slope break. In the last two decades the formation of glauconite in shallow water environments was progressively recognized and utilized in palaeoenvironmental reconstructions. The Lower Kimmeridgian to Late Tithonian Zlatni rt (ZR) clay is one of the examples of glauconite formation in shallow water environment and a rare example of glauconite formation from a palaeosol. The ZR clay occurrence represents a decimetre thick horizon of grey clay embedding the black pebbles. The clay is also present as infills in the karstified bedrock, in which the glauconite is present within the contact zone of the clay and bedrock. The clay is primarily composed from mixed-layered illite–smectite, 2M<sub>1</sub> illite, kaolinite, vermiculite, pyrite, marcasite and titanium oxides. The clay itself can be identified as a palaeosol which formed in contact with the marine environment, indicated by the high Sr/Ba ratios and enrichment of heavy rare earth elements and a slight negative cerium anomaly. The presence of glauconite was confirmed by SEM-EDS, XRPD and FTIR. The glauconite formed mainly through the fixation of potassium and iron into illite and illite–smectite, but there is also strong evidence of its neof ormation through bacterially mediated dissolution of present phyllosilicates. The source of iron was most likely terrigenous, as there is evidence for a ferralitic input through the presence of kaolinite in the ZR clay. Glauconite is also present in a more reduced form and as a more oxidized form, which display an alternation with pyrite in veins. This reflects the oscillations in the redox potential during glauconite formation, which can be linked to the variations in water column depth during the initial stages of the transgression. The final drowning of the ZR clay is recorded with the precipitation of coarse euhedral pyrite, during which the deposition of lagoonal Upper Tithonian Kirmenjak limestones had started.

This work has been fully supported by Croatian Science Foundation under the project IP-2019-04-8054 – Wian-Lab (Western Istrian Anticline as an Ideal Natural Laboratory for the Study of the Regional Unconformities in Carbonate Rocks).