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

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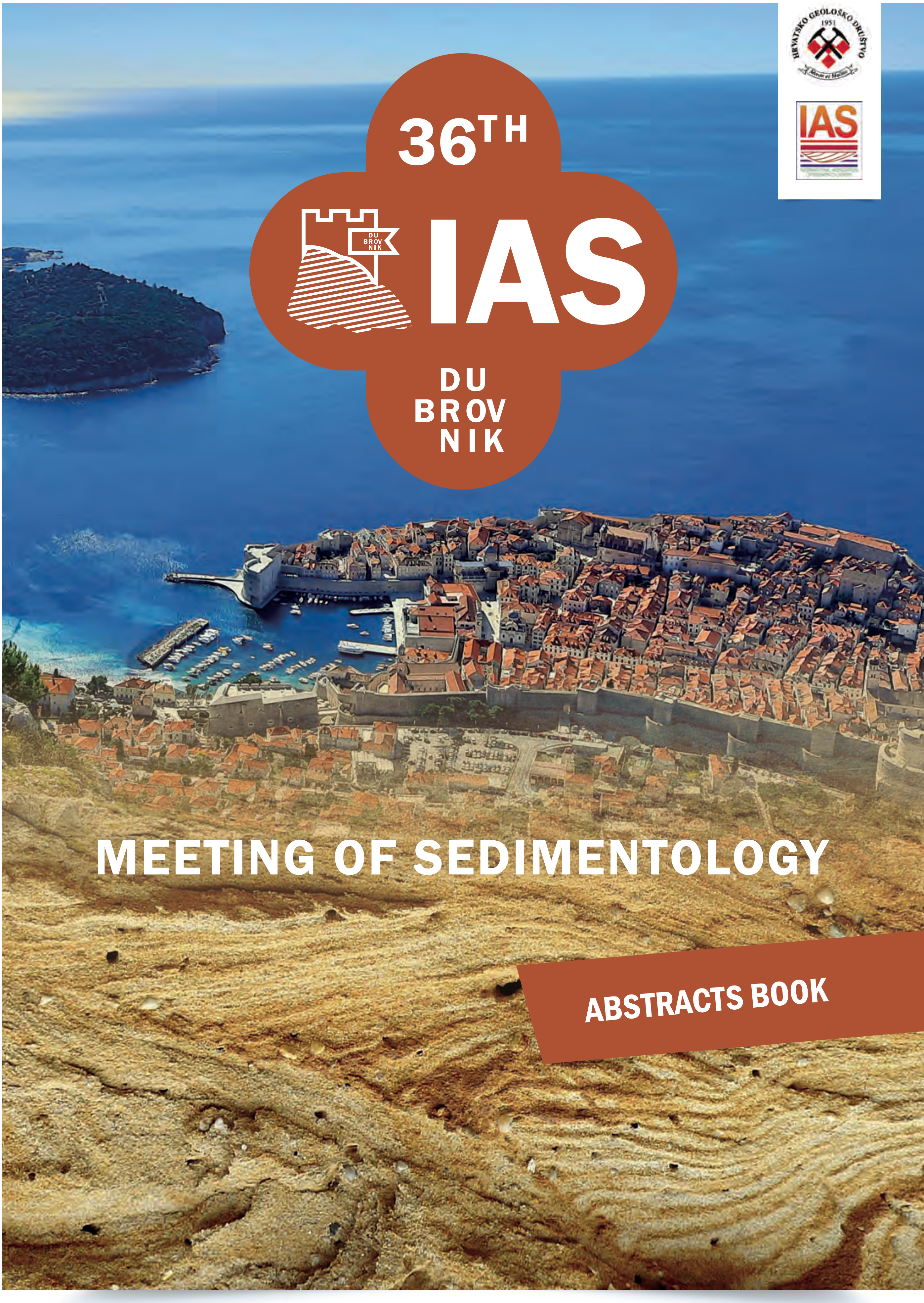

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ABSTRACTS BOOK

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Oral presentation

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

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Glauconite is usually found as a replacement of bioclasts and faecal pellets through neoformation 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, $2M_1$ 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 neoformation 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.

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