Paleoenvironmental and paleoclimatic changes during the deposition of Upper Jurassic bauxites and their immediate cover: case study of the Rovinj bauxite pit, Istria, Croatia

Perković, Ivor; Durn, Goran; Cvetko Tešović, Blanka; Škapin, Srečo D.; Matešić, Darko; Vlahović, Igor; Martinuš, Maja; Mihovilović, Milan; He, Tianchen; Newton, Robert J.

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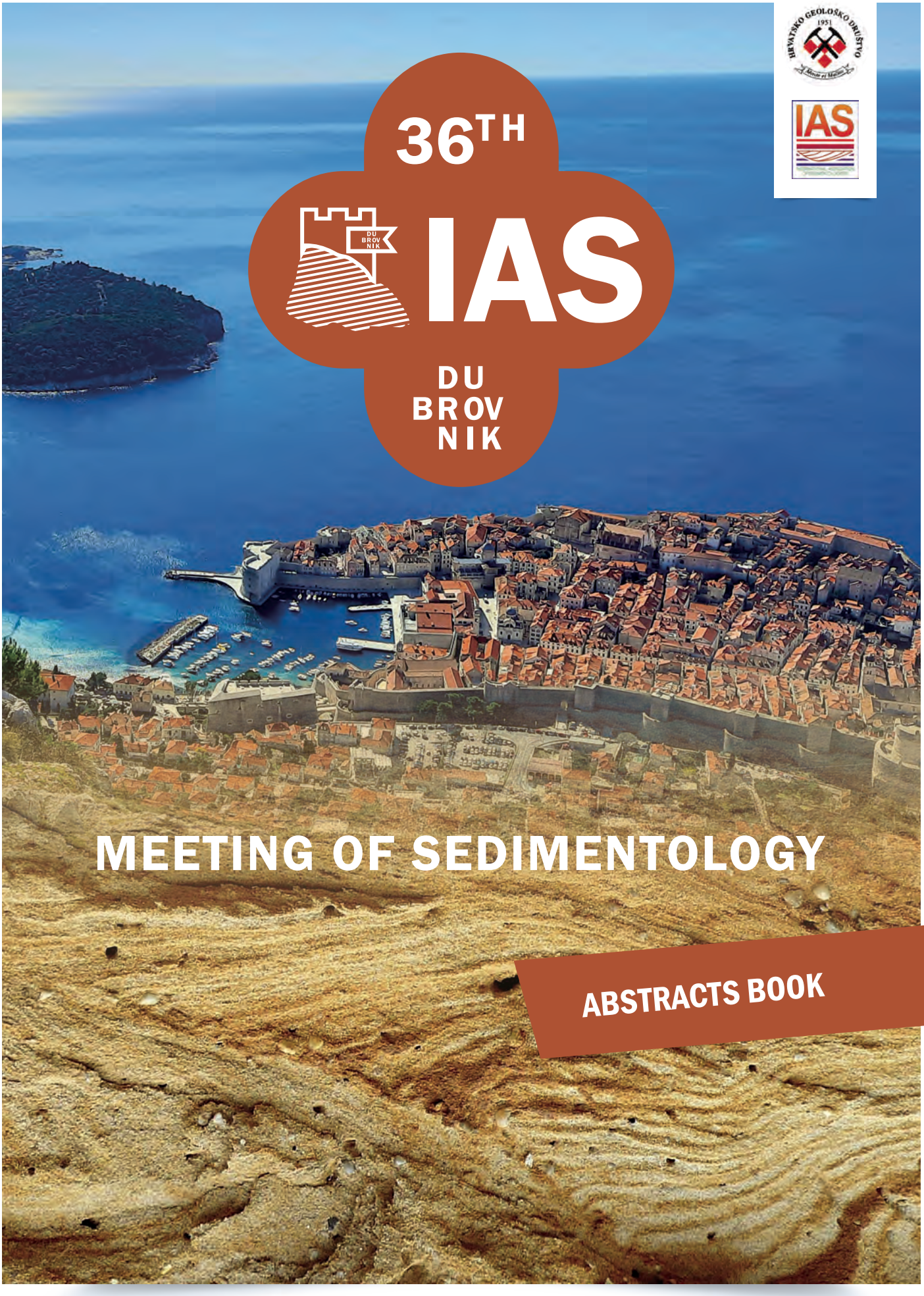

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ABSTRACTS BOOK

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ABSTRACTS BOOK

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Theme 12. Stratigraphic markers and archives

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Poster presentation

Paleoenvironmental and paleoclimatic changes during the deposition of Upper Jurassic bauxites and their immediate cover: case study of the Rovinj bauxite pit, Istria, Croatia

Ivor Perković[1], Goran Durn[1], Blanka Cvetko Tešović[2], Srečo D. Škapin[3], Darko Matešić[1], Igor Vlahović[1], Maja Martinuš[2], Milan Mihovilović[4], Tianchen He[5,6], Robert J. Newton[5]

[1]University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering, Zagreb Croatia
[2]University of Zagreb, Faculty of Sciences, Department of Geology, Zagreb, Croatia
[3]Jožef Stefan Institute, Advanced Materials Department, Ljubljana, Slovenia
[4]GEO-5, Rovinj, Croatia
[5]School of Earth and Environment, Leeds, UK
[6]College of Oceanography, Nanjing, China
ivor.perkovic@rgn.hr

The aim of this study was the reconstruction of paleoclimatic and paleoenvironmental changes which occurred during the deposition of Upper Jurassic bauxite, and their cover beds, which comprise a cyclic alternation of clays, limestones, and black pebble breccias. Clay and bulk mineralogy, geochemistry and micromorphology of bauxites and clays was studied using XRPD, SEM-EDS, ICP-MS, XRF, AAS and petrography. The bauxite is composed from haematite, boehmite and kaolinite with variable amounts of 14 Å clay, illite and titanium oxides. The composition of major oxides is consistent with the mineralogical composition and is uniform throughout the profile. The values of rare earth elements and variations in the trace element values displayed differences throughout the bauxite profile, distinguishing two bauxite sections, both capped by two clay illuviation rich horizons. The upper section has numerous erosional features and clastic bauxite beds, which when coupled with its different trace elemental fingerprint indicates its deposition over the older pelitomorphic section. This change is likely a consequence of a paleoclimatic shift towards a more seasonal climate during the formation of the younger part of the bauxite. This can be related to the oscillating transgression succeeding the bauxite formation, which is recorded in the cyclical beds covering the bauxite. The clays from the cover beds are composed from dioctahedral vermiculite, kaolinite, illite and a mixed-layer clay mineral (MLCM) consisting of illite and dioctahedral 14 Å phyllosilicate. The increase in illite and MLCM over kaolinite and the increase in Sr/Ba ratio along the profile, indicate a change from a lacustrine towards a marine environment. The iron speciation data supports this, as it recorded the redox changes which indicate a transition from a closed lacustrine environment to an open marine environment. Overall, the study of both bauxites and their cover, allowed a detailed reconstruction of a late Kimmeridgian transgression that followed a terrestrial phase in this part of the Adriatic carbonate platform.

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