

Major facies changes in the Early Jurassic on the Dinaric Carbonate Platform margin and in the Budva Basin (Montenegro)

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Background

The goal of my PhD thesis is to reconstruct the Early Jurassic platform-to-basin depositional system in Montenegro. During a 10-day field work in the region of Rumija we focused on two time intervals, the Triassic-Jurassic boundary and the Pliensbachian-Toarcian. In Montenegro these two intervals are reflected as major facies changes in both settings, in the pelagic Budva Basin and in the shallow-water environment of the Dinaric Carbonate Platform (DCP). Based on microfacies analyses, fossil determinations and geochemical analyses we hoped to demonstrate that major facies changes are associated with perturbations of the global carbon cycle. In total five sections across the Triassic-Jurassic boundary and four across the Pliensbachian-Toarcian interval were sampled. In autumn 2008 two sections (Dragovići and Kostanjica) containing the transition from the latest Triassic to the earliest Jurassic carbonates were sampled on the DCP margin and two spanning the Pliensbachian-Toarcian interval one on DCP margin and one in the Budva Basin. Microfacies analyses were done at the Ivan Rakovec Institute of Palaeontology and stable carbon and oxygen analyses of samples were done during a 6-day stay at the ETH Zürich. The IAS grant covered the expenses of both, a 10-day field work in Montenegro and a 6-day stay at the ETH Zürich.

Results

Two sections spanning the Triassic-Jurassic boundary interval, Dragovići and Kostanjica, are lithologically almost identical – latest Triassic thick bedded stromatolitic limestones are overlain by early Jurassic medium bedded micritic limestones. However, only at Kostanjica section mineralized hardgrounds occur exactly at the contact. Furthermore, the micritic limestones at Kostanjica start with pink bioclastic and peloidal packstones to mudstones; upsection the percentage of bioclasts is reduced and mudstones to wackestones prevail. At Dragovići the thickness of packstones is reduced in comparison with Kostanjica. Altogether 160 samples were taken for microfacies determinations and stable carbon and

oxygen isotope analyses. More than 60 thin sections were made and the microfacies described. Stable carbon and oxygen isotope compositions of 70 samples were analysed.

The section comprising the Pliensbachian-Toarcian interval on the Dinaric Carbonate Platform margin corresponds to peloidal limestones with abundant chert, overlain by early Toarcian marly limestones in alternation with marls and followed by bioclastic limestones with abundant brachiopods and echinoderms. The interval was sampled in detail for fossils (nannoplankton, radiolarians, and brachiopods), thin sections and geochemical analysis; altogether 130 samples were taken. The section in the Budva Basin corresponding to the same time interval was sampled at Bar section; the redeposited peloidal limestones with chert are overlain by thick marly horizon, which is poorly exposed. The next outcropping beds are bundles of oolitic limestones with marly tops. Altogether 160 samples were taken for fossil content (radiolarians, nannoplankton), thin sections and geochemical analyses. Microfacies have been already determined, but the stable carbon and oxygen isotopes of carbonates remain to be analysed.

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