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Marine historical ecology at the Brijuni Islands, Croatia: preliminary results from down-core changes of foraminiferal assemblages

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The Late Holocene in the northern Adriatic is characterized by the eustatic peak of the sea-level rise, followed by the equilibrium between the regional tectonic subsidence and hydro-isostatic emergence and relatively stable sea level for a few thousand years. During this period the area experienced changes in sedimentation rate, food/oxygen availability in the benthic ecosystem and eutrophication with seasonal hypoxic and anoxic events. In order to reconstruct the marine paleoecology in the Brijuni Islands area during this period, a multidisciplinary study was carried out, including geochemical (TOC, trace metals, carbonate content), micropaleontological analyses (benthic foraminifera) and dating of sediments and mollusc shells. The principal aim of this study is to observe the effects of ecological shifts on foraminiferal assemblages during the Late Holocene.
One core of 1.5 m length was taken at a sampling station south of Veli Brijuni Island, located within a marine protected area with no fishing/dredging pressure (Croatian national park). The core was sliced into smaller subsamples, and four sediment fractions of each subsample (63, 125, 250 and 500 μm) were analyzed for standard properties of the foraminiferal community (species richness, faunal composition, biodiversity indices), in comparison with relevant physical and geochemical properties of the sediment.
The results concerning changes in foraminiferal species composition and abundance point to differences within the core: surface sediments are dominated by suspension feeders (Planorbulina mediterranensis, Lobatula lobatula, Cibicides variabilis, Cibicides refulgens), whereas deposit feeders (genera Textularia, Siphonaperta, Adelosina, Trioculina) appear in higher abundances at approximately 30 cm of the sediment depth and dominate down-core. Species richness in the first 30 cm is lower (10 to 34 species per sample) in comparison to the middle part of the core (39 to 53 species), and decreases again at 100 cm to 25 to 42 species per sample. Diversity indices follow the pattern of species richness and point to normal marine conditions. Similarity indices rise with core depth. The radiometric dating of the sediments together with carbon-calibrated amino acid- racemisation of mollusc shells from selected species will help to determine the timing of major ecological changes.