DYNAMICS OF FORAMINIFERAL ASSEMBLAGES IN THE SEDIMENTS IN FRONT OF THE CETINA RIVER MOUTH, CROATIA

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Abstract
Bottom sediment characteristics and composition dynamics of foraminiferal assemblages in samples taken in front of the Cetina River mouth indicate that this is stable envoronment with the occasional input of large amount of terrigenous material. In this sedimentary environment relative large number of shallow water benthic foraminiferas was found (236) with prevalence of individuals from *Quinqueloculina*, *Ammonia* and *Haynesina* genera.
Keywords : Adriatic Sea, Foraminifera, River Input, Sediments.

The sediment cores (up to 12 cm long) were collected at two stations (P1 and P2) in front of the Cetina River mouth (eastern shore of the Adriatic Sea) over the period of one year (four sampling campaigns: May, August, November 2003 and April 2004). The spring of the Cetina River is situated in non-carbonate rocks and its drainage basin is made of carbonates (Cretaceous) and flysch deposits (Upper Eocene) [1]. The main reason why Cetina River carries a large amount of material and deposits it at the river mouth is the weathering of Flysch. The Cetina River has a torrental character with big and rapid flow changes (the average flow at the river mouth is 116 m^3/s) [2]. The stratification of the water column is present at the mouth, in the upper layer there is the low density fresh water, and at the bottom there is the high density sea water [3], which shows characteristics of the salt wedge estuay.

The granulometric analysis revealed sandy sediment at the P1 station (10 m depth) through the core length in all samplings. At the P2 station (30 m depth) the bottom sediment type, found in the samples collected in May and August 2003, was silty sand throughout the core, while the sediment collected in November 2003 and April 2004 was sand. It is assumed that the change of the sediment from the finegrained (silty sand) into the mediumgrained (sand) is the result of river Cetina's hydrodynamic influence and the input of new material during heavy autumn and spring rain, which had preceded these two samplings.

The micropaleontologic analysis was performed on the total assemblages at both stations due to a small number of stained individuals. The preservation of foraminiferal tests was generally good. The biological diversity of the foraminiferal assemblages at the P1 station was from 37 to 63 species in each sampling. At the P2 station the biological diversity was somewhat higher with the number of species ranging from 56 to 75 in each sampling. The seaward increase of species diversity is in accordance with the change of sediment substrate. The more finegrained and richer with organic detritus the sediment is, the more acceptable it is for the life of shallow water foraminifers. Foraminiferal assemblages at both stations (P1 and P2) were of moderate diversity (index S(H) - between 2.96 at the P1 station and 3.83 at the P2 station in November 2003) and of small domination (D - between 0.03 at the P2 station in May and November 2003 and 0.09 at the P1 station in November 2003). At the P1 station in all samplings individuals from *Quinqueloculina seminula* and *Ammonia tepida* species were the most abundant, but constituted only up to 20 % of the total assemblage. On the other hand, at the P2 station the most abundant individuals were those from *Pseudoparrella exigua*, *Haynesina depressula* and *Ammonia tepida* which also constituted up to 25% of the total assemblage. The abundance of *P. exigua* species decreased along with the change of sediment type in the samples from November 2003 and April 2004. This could indicate that this species is sensible to changes of sediment substrate, which in this case means that it prefers the finegrained sediment. Interesting enough, the abundance of *H. depressula* and *A. tepida* species did not change significantly with the change of the sediment type. The epifaunal species were more represented in the sand (up to 75 %), which is found at the P1 station (in all four samplings) and the P2 station (November 2003 and April 2004). However, in the silty sand, found at the P2 station (May and August 2003), the epifauna - infauna ratio was in balance (35 - 50 % respectively). The ratio of infaunal and epifaunal species was in accordance with the bottom sediment type. The unusually high ratio of individuals of epifaunal species from the family Miliolida (up to 45 %) at the P1 station could partly be caused by the input of dead individuals from the nearby meadows of *Posidonia oceanica* seagrass.
Although the samples were taken from the river mouth area, the measured bottom water salinity was $\sim$ 38, which is in accordance with the normal marine environment. However, this does not exclude the salinity decrease during high river water input. In summary, the moderate diversity of foraminiferal assemblages (236 species) indicates that this is a stable environment with occasional stress (most probably periodical salinity decrease). This can be related to the fact that in almost all samples there was a constant occurrence of individuals from *Quinqueloculina*, *Ammonia* and *Haynesina* genera, which are described as euryhaline genera typical of the environment with variable salinity [4].

References

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