

## CARBON BASED PROXIES OF PALAEOENVIRONMENTAL RECORDS IN THE SEDIMENTS OF TWO LAKES, THE PLITVICE LAKES, CROATIA

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Six sediment cores, top 30-40 cm, from two lakes of different sizes, Lake Prošće and Lake Kaluđerovac, situated in the karst region of the Plitvice Lakes system, Croatia, were studied by mineralogical and structural, C/N and total organic carbon (TOC) and isotopic analyses ( $\delta^{14}\text{C}$  and  $\delta^{13}\text{C}$  of carbonate and organic fractions). Morphological and structural properties of the calcite particles at micron and submicron-sized level indicate that calcite mineral phase is formed by active authigenic precipitation in investigated lake systems. The sediment is composed mainly of calcite, however, this study showed that the OM fraction has an important role and that analyses of both fractions and the relation between them give good overview of the processes in the lake. In the small Lake Kaluđerovac measured distributions of carbonate and OM fractions, C/N, TOC, and  $\delta^{14}\text{C}$  and  $\delta^{13}\text{C}$  values of both fractions along the sediment depth showed similar values for all three cores with small variations in each core indicated very homogenous precipitation of autochthonous calcite. In the bigger Lake Prošće, the large differences in sediment composition of the three cores indicated different conditions of sediment precipitation inside the lake: in the coastal area the sediment was found to be a mixture of allochthonous and autochthonous fractions, while the deep-water sediment indicated in-situ calcite precipitation and aquatic OM produced in the lake.

The response of the lake sediment to the environmental conditions does not depend particularly on the size of the lake, but the surrounding environmental conditions could have great influence on the sediment composition. Extreme hydrological events in 1981 and 2010 were identified by disturbances in carbon isotopes distributions. Local anthropogenic influence was not evident, but the response to the global contaminations was observed by the occurrence of a  $\delta^{14}\text{C}$  peak in both carbonate and organic fractions. Increased bioproductivity in Lake Prošće in the last decades can be correlated with the slight increase of the lake water temperature in last three decades.

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