

Source of Sedimentary Organic Matter in the Adriatic Sea

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Organic C, N and P contents, and $^{13}\text{C}/^{12}\text{C}$ and C/N ratios of organic matter in surficial sediments of the Adriatic sea were used to study the distribution, origin and diagenetic transformations of sedimentary organic matter. Using the differences in $\delta^{13}\text{C}$ values and C/N ratios between autochthonous marine (planktonic) and allochthonous (riverine) organic matter in the Adriatic was possible to determine the origin of recent surficial sedimentary organic matter and that from the short cores indicating the past environmental conditions in the sea. Linear relationship between sedimentary organic C and $\delta^{13}\text{C}$ values demonstrated an important influence of terrestrial to surficial sedimentary organic C and an organic C content of purely planktonic origin

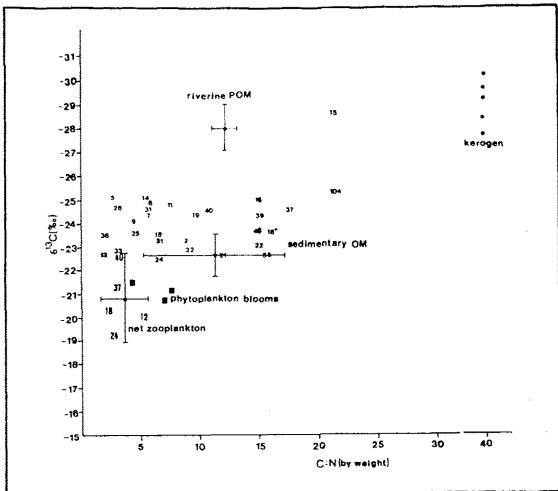


Fig. 1: $\delta^{13}\text{C}$ values vs. C/N ratios of sedimentary organic matter (OM) and different classes of organic matter (phyto- and zooplanktonic, allochthonous particulate organic matter - POM, middle Adriatic kerogen) in the Adriatic area. Mean values \pm SD of $\delta^{13}\text{C}$ and C/N ratios are presented for organic matter from the Gulf of Trieste (N. Adriatic)

of about 0.15 %. Constructing the mixing model for determination of marine and terrestrial contributions to sedimentary organic matter we used the $\delta^{13}\text{C}$ values and C/N ratios of different end-members (Fig. 1), i.e. phytoplanktonic ($\delta^{13}\text{C} = -21.0$ ‰; C/N = 6) and riverine ($\delta^{13}\text{C} = -28.0$ ‰; C/N = 12) organic matter in the Adriatic area. We supposed the shift of $\delta^{13}\text{C}$ values of about 1.5 - 2 ‰ due to diagenetic transformations of organic matter occurring in the water column and surficial sediments.

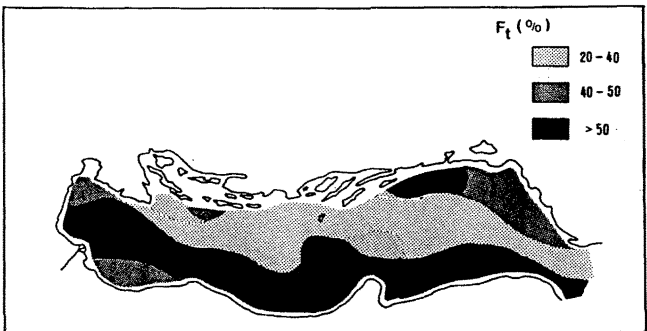


Fig. 2: Distribution of terrestrial organic carbon (F_t) in the Adriatic surficial sediments

The geographical distribution of higher terrestrial contribution to sedimentary organic matter (Fig. 2) also reflected in the higher organic C, N and P contents, is restricted to the western part of the Adriatic along the Italian coast strongly influenced by the river Po and other Italian river inflows and to southeastern part of the Adriatic affected by local (Albanian) riverine inputs. This areal distribution is a consequence of the general counterclockwise water circulation system and sedimentological properties of the Adriatic. The area of higher organic C content in the Jabuka Pit is, on the other hand, more direct consequence of higher biological production in this area. The distribution of organic C content and the $\delta^{13}\text{C}$ values within the short dated cores collected in the middle Adriatic suggested that the bioproductive conditions in the past were similar to those of the present day. The higher C content and lower $\delta^{13}\text{C}$ value observed in horizon from about 15 000 B.P., after the last glacial period, was attributed to a larger terrestrial contribution by increased river flow.