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# Distribution of benthicmicroalgae and nutrients in tidalflat sediments estimating from chemical composition and delta13C

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Community compositions of microalgae that respond to environmental fluctuations have been often used as indicators of paleoenvironmental ploxis, organic water pollution, and so on. Benthic microalgae potentially adapt to wide ranges of environmental conditions, and their growth is mainly controlled by intensity of light and feeding pressure. However it is possible that specific nutrients determine the community compositions under the similar physical conditions. In order to contribute to our knowledge about relationship between community compositions of benthic microalgae and nutrients in estuarine tidal flat, this study provides the results of analyses of chlorophyll *a*, elemental compositions, $\delta^{13}$C ratio and $\delta^{15}$N ratio in tidal flat sediments.

Study site is located at Fujimae-higata inner part of Nagoya Port in Aich Prefecture, central Japan. Samples of surface sediments (1.5 cm depth, n=25) were subjected to analyses of chlorophyll *a*, TOC, TN, $SiO_2$, $TiO_2$, $Al_2O_3$, $Fe_2O_3$, MgO, MnO, CaO, $Na_2O$, $K_2O$, $P_2O_5$, Cr, Cu, Pb, Zn, Zr, $\delta^{13}$C and $\delta^{15}$N.

The surface sediments are characterized by high positive correlations of chlorophyll *a* with TN ($r = 0.70$, $p<0.001$) and TOC ($r = 0.68$, $p<0.001$). On the other hand the correlation between chlorophyll *a* and excess-P that is available for microalgae is very low ($r = 0.09$, $p>0.5$). Based on analysis of principal component chlorophyll *a* and other elements can be categorized into three groups, i) elements associated with coarse-grained materials, such as Al, Ca, and K, ii) elements adsorbed and /or bounded to fine-grained materials such as Cr, Cu, Pb, Zn, Fe, and P, iii) elements associated with organic matter, such as TOC, TN, and chlorophyll *a*. According to these results, three segments were identified for Fujimae-higata, including Segment 1 closest to the river mouth where sediments are dominated by coarse-grained materials, Segment 2 away from the river mouth, characterized by fine-grained materials, and Segment 3 between Segments 1 and 2, characterized with organic matter. Values of $\delta^{13}$C of surface sediments (average = -25.99 ‰, n = 25) are almost the same as those of suspended matter in the closest river (average = -25.94 ‰, n = 9). Benthic microalgae tend to have heavier $\delta^{13}$C ratio (approx. -18 ‰) than phytoplankton and the highest $\delta^{13}$C ratio in the analyzed sediment samples is -24.6 ‰. This suggests that the contribution of benthic microalgae to the sediment organic matter is small. The organic matter in Fujimae-higata sediments is likely supplied largely by riverine inflow.

Keywords: benthic microalgae, nutrients, tidal flat sediments