Comparison between fossil diatom assemblages and algal biomarkers in modern sediments from Seto Inland Sea.

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Microalgae play an important role as a primary producer, and are known as useful environmental indicators in the hydrospheric ecosystem. However, most of the microalgae except diatom have decomposable tests and are hardly preserved in the sediment so that it is difficult to reconstruct their temporal change. Organic molecules (biomarkers) are recently used as another indicator to evaluate the dynamics of primary producers and to reconstruct paleoenvironments. There, however, has few investigations for correlations between monitoring data for algal production, fossil assemblage, and biomarker compositions in the field. Seto Inland Sea underwent human-induced, eutrophication after the WWII, and drastic change of eutrophication was well recorded in the sediment. In the present study, we investigate the fossil diatom abundances and biomarker concentrations in surface and subsurface sediment cores from Seto Inland Sea. The cores were taken from Osaka Bay and Harima-nada Bay (eastern part of Seto Inland Sea), in which lengths are 20 cm and 40 cm, respectively. These cores are divided and analyzed in every 5 cm (12 samples). Although the precise age of the core has not been determined yet, it could be deposited for several decades, according to the sedimentation rates by previous study (Yasuhara *et al.*, 2007).
Diatomaceous species such as small *Thalassiosira* spp. and *Neodelphyneis pelagica*, which were reported by previous study (Hirose *et al.*, 2008), are observed as the dominant taxa in all samples. The valve contents (valves / 1 g dry sediment) are higher in sediments from the Osaka Bay than Harima-nada Bay, indicating variations of their productivity. The vertical distribution of valve content show a increasing trend reflecting eutrophication in Harima-nada, on the other hand, it doesn't show clear trend in Osak Bay. To the contrary, the concentrations of steroids (except dinoflagellate-derived dinosterols), which are synthesized in eukaryotic microalgae, are higher in Harima-nada Bay than Osaka Bay, and decrease toward the upper layers. Futhermore, highly branched isoprenoids (HBIs), which are biomarkers of specific diatom taxa, shows very similar distributions to those of fossil diatoms. These results suggest the effect of productivity of other algal taxa that are hardly preserved in the sediment as fossils, and the different process of diagenesis of diatom valves and organic molecules. We also discuss the detailed characteristics of each diatom taxa and biomarker molecules which are contained in specific taxa.
References:
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