

Environmental changes and their factors based on grain size variation of the Takashima-oki core samples, Lake Biwa, Central Japan

Emiko Saitoh[1]; Yoshio Inouchi[2]

[1] Biology and Earth Sci., Ehime Univ; [2] CMES, Ehime Univ.

A continuous environmental history during the middle-late Quaternary is well preserved in the sediment of Lake Biwa. In 1986, a 150 m deep drilling was carried out off Takashima (63 m in water depth) that is located in the middle of Oki Island and the Ado-gawa delta, in Lake Biwa. Takashima-oki core samples are chiefly composed of silty clay, with many intercalated tephra layers. Age model of the sediment was obtained based on ^{14}C age and that of widespread tephra. In this study, grain size of the samples was analyzed at intervals of 5 cm (ca. 132-154 year), using laser diffraction and scattering method. In addition, the density of selected samples was measured, and smear slide of them were observed. By comparing these results and chemical variation of the Takashima-oki sediment with the global paleoclimate indices (SPECMAP, Dansgaard-Oeschger cycle), the factor of grain size fluctuation was examined.

Chronological variation of median grain size shows that finer sediments correspond to cold periods, and coarser sediments to warm periods. There is a positive high correlation between median grain size and content of T-C, T-N and bio-SiO₂ as it goes to the upper part of the core. Median grain size profile also shows a good correlation with that of SPECMAP, and it becomes coarser during the odd number stage of marine oxygen isotope stages (MIS) and finer during the even number stages. Median grain size and density show negative correlation. Smear slides of coarse horizons are characterized by high diatom content.

Based on these results, it is evident that diatom concentrations greatly contribute to the median grain size. Amount of nutrient inflow might have caused changes in diatom productivity in Lake Biwa. Accordingly, it is considered that variation of precipitation might reflect to the grain size fluctuation. Some of the maxima of median grain size and total carbon content can be correlated with Interstadial period observed in Dansgaard-Oeschger cycle. It is suggested that some kind of teleconnection might be existed between the temperature change in Greenland and that of grain size in Lake Biwa.