

Environmental changes based on grain size fluctuations of the Takashima-oki core samples, Lake Biwa, central Japan

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A continuous environmental history from the middle Pleistocene to the present is excellently preserved in the sediment of Lake Biwa. In 1986, a 150 meter deep drilling was carried out at Takashima-oki site which is 63 meters with deep and locates between Okinoshima Island and Ado-gawa delta of Lake Biwa. The sediment core consists chiefly of clay, with many intercalated tephra layers. Age model of the sediment was obtained based on depth versus ^{14}C age and that of widespread tephra. In this study, grain size of the sediment was analyzed based on laser diffraction and scattering method by SALD-2100 of Shimadzu Co., at intervals of 5 centimeters that corresponding to ca. 135-300 years. In addition, grain density of sediments was measured by AccuPyc 1330 of Micromeritics Co., and smear slides of them were observed by binocular microscope.

Median grain size of finer horizon varies from 3.2 to 5.3 μm , and that of coarser horizon varies from 5.0 to over 10.0 μm . Particles which influence the values of median grain size are composed mainly of diatom valves. Median grain size and grain density show negative correlation. Median grain size synchronously varies with total carbon content and diatom content. Nutrient inflow associated with rainfall can change diatom productivity in Lake Biwa. Consequently, variation of precipitation may affect grain size fluctuation.

In addition, median grain size profile also shows a good correlation with that of Low Latitude Oxygen Isotope Stack. Median grain size becomes coarser during warm period and becomes finer during cold period. Moreover, some of the maxima of median grain size well correlate with interstadials observed in Dansgaard-Oeschger cycle of Greenland Ice Cores. These results show that median grain size of sediment is one of the strongest proxies of paleoenvironments.