

Tectonic and climatic record of present Lake Biwa revealed by drilling study

Keiji Takemura [1], Akira Hayashida [2], Masayuki Torii [3], Takuo Yokoyama [2]

[1] Dept.Geophysics, Grad. Sci., Kyoto Univ., [2] SERI, Doshisha Univ., [3] Fac. Info., Okayama Univ. Sci.

Sediment cores have been obtained from piston coring and deep drillings from present Lake Biwa. The 1982-1983 coring revealed that the southern basin of modern Lake Biwa contains five sedimentary units of total 911m in thickness. The uppermost unit, the T bed, is a 250-m thick unit composed of lacustrine deep water clays during the last 430 thousand years. At least five episodes of warmer and wetter climates have been identified in the T Bed and correspond to interglacial times. Analysis of seven piston cores obtained from three sites in Lake Biwa provides a detailed stratigraphy of the lake sediments for the last 40 kyrs.

Lake Biwa has a geologically long history - from 6 Ma to present - and has been the subject of many paleolimnological and biogeographical studies. Deposition began in the predecessor of modern Lake Biwa to form the Miocene -Pleistocene Kobiwako Group, which is found uplifted in hills mostly to the south of the present lake but also to the west. Sediment cores have been obtained from piston coring and deep drillings. The 1982-1983 coring revealed that the southern basin of modern Lake Biwa contains five sedimentary units that total 911m in thickness and which overlie Paleozoic-Mesozoic basement rocks. The oldest of these units is Pliocene in age. Major tectonic changes around Lake Biwa have left their marks on this sedimentary record. The uppermost unit, the T bed, is a 250-m thick unit composed of lacustrine deep water clays. This bed is an important unit for paleolimnological and biogeographical studies because of its apparent continuity under deep lacustrine waters during the last 430 thousand years. At least five episodes of warmer and wetter climates have been identified by stratigraphic records of pollen, sediments grain size, diatoms, and organic matter composition in the T Bed and correspond to interglacial times.

Analysis of seven piston cores obtained from three sites in Lake Biwa provides a detailed stratigraphy of the lake sediments for the last 40 kyrs. Description of lithology and measurement of magnetic susceptibility reveal occurrence of volcanic ashes at ten horizons. Most ash layers are observed in multiple cores from the three sites and also in earlier cores, establishing correlation and age assignment of the core sediments. The age-depth curves deduced from published tephra ages show that significant difference in sedimentation rates occurs in Lake Biwa. Homogeneous sediments deposited with a high sedimentation rate characterize the central part of the depression.