

The sedimentological and geochemical characteristics in a sediment core (BIW08-B) from Lake Biwa, central Japan

Shigenobu Nagasawa^{1*}, Hiroyuki Kitagawa¹, Keiji Takemura²

¹Earth and Environ. Sci., Nagoya Univ., ²Grad. sci., kyoto Univ.

A 100-m long core (BIW08-B core) was collected from the central part of Lake Biwa in 2008. Dry bulk density, contents of biogenic opal and lithogenic minerals were determined on 494 samples, continuously collected using 7 ml cubes (2.2 cm interval), from the upper 13 m. With the sedimentation rate estimated from the combination of ¹⁴C ages of macrofossils and reported ages of volcanic ash depositions, mass accumulation rates (or flux) of bulk sediment (MAR), biogenic opal (MAR-opal) and lithogenic minerals (MAR-lith) were calculated. Assuming on a constant density of lithogenic minerals, MAR-lith was further converted into the size-specific values using the data of grain-size distribution of lithogenic mineral. We have interpreted these results with a couple of working hypothesis.

The similarity in pattern between MAR-opal and the size specific value of MAR-lith for >20 micrometers may suggest that the lake primary production was controlled by the supply of terrestrial matters (potentially, containing rich nutrients) through the rivers, probably relating to the amounts of summer precipitation in the catchment area of Lake Biwa. If this is verified, the variation of SAR-opal should be useful for identifying the Wet/Warm or Dry/Cold periods, potentially relating to the summer monsoon intensity.

Because the median size of eolian dust transported from the Asian continent is about 10 micrometers, the characteristic patterns of size-specific value of MAR-lith for 4-20 micrometers might be induced by the change in the intensity of atmospheric circulations such as westerlies and Asian winter monsoon, which can transport the large amount of eolian dust to Japanese Islands in spring. The size-specific value of MAR-lith for 4-20 micrometers is approximately synchronized in pattern with $\delta^{18}O$ of GISP2. The enhanced periods of atmospheric circulation over the eastern Asia appear during the Heinrich Event (H1-H5) periods, cool periods in the Atlantic region and Greenland. This fact might provide an additional evidence of the interhemispheric climate teleconnection during the past 50 ka.