Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

STT58-02 Room:106 Time:May 24 15:45-16:00

High-resolution magnetostratigraphy of Lake Biwa sediments

HAYASHIDA, Akira[1*]

[1]Doshisha University

Magnetostratigraphy is ”the element of stratigraphy that deals with the magnetic characteristics of rock units.” Although magnetic polarity of remanent magnetization is generally used for identification of magnetostratigraphic units, other features of geomagnetic field variation, such as paleointensity change and paleosecular variation, provide basis of high-resolution magnetostratigrapy for time periods shorter than magnetic polarity intervals. In addition, variation of magnetic properties of strata, such as magnetic susceptibility, can be utilized for stratigraphic correlations, in case that variation of magnetic properties reflects environmental changes in regional or global scale.

Lake Biwa, located in central Japan, contains a thick sedimentary sequence deposited in lacustrine or fluvial environments during the Pleistocene. Magnetostratigraphic and tephrostratigraphic analysis of deep-drilling cores from the central basin showed that about 800-m thick sediment has been deposited for the last 1.3 m.y. It was also revealed that anhysteretic remanent magnetization (ARM), a measure of magnetic mineral content in sediment, provides a good proxy of hydrological changes around Lake Biwa since the last glacial period. While low-field magnetic susceptibility is most widely used for stratigraphic correlation of core samples and detection of paleoenvironmental changes, ARM is more sensitive to concentration of ferrimagnetic minerals such as small magnetite grains. We interpret that the increased ARM represents enhanced precipitation probably associated with higher monsoon activity. Characteristic features of the ARM records are identified at horizons consistent with widespread tephra layers in 4 piston-cores recovered from wide area in Lake Biwa. It is therefore suggested that the ARM features can be used for stratigraphic correlation at least in Lake Biwa. These features may be assumed as regional or global time markers, because the ARM records are apparently synchronized with the oxygen isotope records from stalagmites in China and the Greenland ice cores.

Keywords: Lake Biwa, magnetostratigraphy, climate change, geomagnetic excursion, environmental magnetism