Oral | Symbol S (Solid Earth Sciences) | S-EM Earth's Electromagnetism

[S-EM37_30AM1]Geomagnetism, paleomagnetism and rock magnetism

Convener:*Ataru Sakuraba(Department of Earth and Planetary Science, University of Tokyo), Nobutatsu Mochizuki(Priority Organization for Innovation and Excellence, Kumamoto University), Chair:Ataru Sakuraba(Department of Earth and Planetary Science, University of Tokyo), Yuhji Yamamoto(Center for Advanced Marine Core Research, Kochi University)

Wed. Apr 30, 2014 9:00 AM - 10:45 AM 413 (4F)

This session is open to recent advances in all areas being concerned with geomagnetism, paleomagnetism, rock magnetism, and their applications to geophysical and geological issues. We welcome presentations on geodynamo, present and past geomagnetic behaviors, fundamental rock magnetic properties, and paleoclimatic changes and tectonic processes revealed by magnetic methods.

10:30 AM - 10:45 AM

[SEM37-P02_PG]Regional differences in magnetic properties of topmost sediments of the Northern Lake Biwa

3-min talk in an oral session

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Keywords:rock magnetic property, Lake Biwa, topmost sediment, early diagenesis

Rock-magnetic investigations have been performed on topmost sediments above about 30 cm below sediment surface (bss) cored in summer (June to July) and winter (November to December) at eight sites with different water depth, where dissolved oxygen (DO) content in bottom water and its seasonal variation are different, in the first depression at the North Basin of Lake Biwa in order to reveal early diagenetic effect on magnetic properties of the sediments. Low-temperature magnetometric results indicate that a partially-maghemitized magnetite is a principal magnetic mineral in the sediments. Warning curves from 6 to 300K of isothermal remanence (IRM) imparted at 6K in 1T after zero-field cooling show a remarkable decrease of IRM between 90 and 120K, which is regarded as a suppressed Verway transition of magnetite. The amount of IRM decrease between 90 and 120K increase downcore at all site, implying the dissolution of maghemite skin covering magnetite. The IRM decrease is more slightly remarkable in the sites with shallower water depth. The degree of maghemitization may be lower in the site. Samples from sites with deeper water depth below about 70m show another IRM decrease between 20 and 30K with the inflection point at about 29K. The IRM drop disappears in samples with hydrochloric acid treatments. These low-temperature IRM behaviors may imply the presence of ferro-rhodochrosite. The IRM drop is detected in samples above about 18 cmbss, and the samples in two zones of 0-3 cm-bss and 6-15 cm-bss show the IRM drop more clearly. The IRM drop is more remarkable in samples with deeper water depth. The occurrence of the magnetic mineral with the characteristic low-temperature magnetic behavior seems to be influenced by the DO values and its seasonal change. As common characteristics in downcore changes of magnetic properties, the downcore decrease of magnetic coercivity is observed in the uppermost sediments above about 10 cm-bss, and the amount and grain size of magnetic minerals subsequently decreases and increases downcore below 10cm-bss, respectively. These changes are considered to be associated with the dissolution of maghemitized magnetite by the early diagenetic effect. The presence of magnetic minerals with finer grain size and higher magnetic coercivity in the sediments above 10 cm-bss is more remarkable in sites with deeper water depth.