R004-06
Zoom meeting A ：11/4 AM2 (10:45-12:30)
10:45-11:00

Contribution of biogenic magnetite on natural remanence magnetization in deep-sea sediments

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Intensity of ancient geomagnetic field, called paleointensity, has been widely studied to understand the variations of the geomagnetic field. Deep-sea sediments are expected to preserve continuous records, and their relative paleointensity (RPI) has been widely used for stratigraphic correlations and age estimations. RPI is the normalized intensity defined as natural remanent magnetization over artificial remanent magnetization like ARM and IRM. RPI estimations are based on the assumption that ARM correctly normalizes the acquisition efficiency of depositional remanent magnetization (DRM). Recent studies have shown the existence of biogenic magnetites in marine sediments, which are originated from magnetotactic bacteria (MTB). MTB have single domain magnetites aligned in chains in their membrane, and biogenic magnetites have higher ARM acquisition efficiency than terrigenous magnetites in general. However, differences of DRM acquisition efficiency between biogenic and terrigenous magnetites have not yet been understood well. Normalized intensity may depend not only on geomagnetic field intensity but also variations in the abundance of biogenic and terrigenous magnetites. In addition, the morphology of biogenic magnetite is expected to be an environmental indicator because it is reported that the morphology of biogenic magnetite varies with chemical conditions of sediments.
My study aims to understand the relation between the normalized intensity and magnetic mineral composition using some cores in which the average normalized intensities are significantly different. The differences of magnetic mineral constituents, in particular biogenic vs. terrigenous magnetites, could affect the normalized intensity, and ARM may not be an appropriate normalizer.
By measuring first-order reversal curves (FORCs), the contributions of biogenic and other detrital magnetic particles were estimated. Using principal component analysis, FORCs were statistically unmixed to the terrigenous and biogenic components with and without collapsed chains. The results suggest that the variations in magnetic properties of sediments can affect the normalized intensity.