R004-10
D 会場 ： 11/26　AM1（9:15-10:45）
9:45〜10:00:00

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Evaluation of magnetostatic interactions for sediment samples using the oblique anhysteretic remanent magnetization

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Oceanic and lacustrine sediments can be used to reconstruct paleoclimatic, paleoenvironmental, and paleoceanographic changes. To accurately understand the causal relationships among these changes, it is essential to compare and evaluate multiple lines of environmental evidence derived from diverse physical, chemical, and biological proxies. This study focuses on oblique anhysteretic remanent magnetization (OARM) and aims to develop it as a new environmental proxy. OARM is acquired by applying an alternating field (AF) together with a direct current (DC) magnetic field oriented at an arbitrary angle to the AF direction. Sato et al. (2017) suggested that the angle between the OARM vector and the direction of the alternating field (the OARM angle) reflects the strength of magnetostatic interactions. The ratio of anhysteretic remanent magnetization (ARM) to saturation isothermal remanent magnetization (SIRM) varies depending on both magnetic interactions and grain-size variations. By combining OARM properties with the ARM/SIRM ratio, it may be possible to distinguish the respective contributions of magnetic interactions and grain-size variations. OARM measurements were conducted on marine sediments from the Okhotsk Sea (Yamazaki et al., 2013) and the Western Equatorial Pacific (Sakuramoto et al., 2017). These sediments exhibit significantly different ARM/SIRM ratios. Moreover, considering their depositional environments, the magnetic properties of these sediments are expected to reflect varying degrees of contributions from magnetic interactions and grain-size variations. During the OARM acquisition, a DC field is applied at a 45° angle to the alternating field, and the DC and AF intensities are set at 71 μ T and 140 mT, respectively. The OARM vector is measuremed using a spinner magnetometer. The magnetization was also measured after AF demagnetization at 30 and 140 mT. In sediments from the Okhotsk Sea, OARM measurements were conducted on samples spanning the past 140,000 years. The OARM angle shows little variation throughout this period, except around 33 ka, where a deviation of approximately 8° is observed. In contrast, the ARM/SIRM ratio exhibits large fluctuations. These results suggest that variations in grain size are the primary factor influencing changes in the ARM/SIRM ratio. This study proceeds to conduct OARM measurements on sediments from the Western Equatorial Pacific. By comparing the results from both regions, the study will evaluate the applicability of OARM properties as a proxy in paleoceanographic research.