R004-02
C 会場 ：11/6　AM1 （9:00-10:30）
09:15〜09:30

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Absolute paleointensity study of lava flows from Tendaho Graben, Afar depression, Ethiopia

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Variation of the geomagnetic field in the latest geologic era is a fundamental subject of research in paleomagnetism. Field strength of the Quaternary have been studied using volcanic rocks, but even the average and dispersion have not been well constrained, obstructing our understanding on the global feature of the geomagnetic field variation. In this study, we conduct absolute paleointensity experiments on lavas in the Tendaho Graben (Afar depression, Ethiopia) to investigate the variation of the geomagnetic field strength over the past million years in East Africa. The Afar depression is located at the rift-rift-rift triple junction between Nubian, Somalian and Arabian Plates, and the Tendaho Graben in the central Afar is one of grabens formed by the spreading process at the divergent plate boundary. Basaltic lava flows with ages ranging from a few thousand to about one million years are widely distributed and are good targets of research to investigate the variation of Quaternary geomagnetic field.

We conducted paleomagnetic, absolute paleointensity, and rock-magnetic measurements on lava samples collected from 54 sites distributed in the Tendaho Graben. Paleointensity experiments by the Tsunakawa-Shaw method were carried out at both Kumamoto University and Kyushu University. First, one pilot specimen for each site was measured at Kumamoto University. For the sites that the pilot specimen passed the selection criteria, one to four additional measurements were conducted at Kumamoto University and/or Kyushu University. Results obtained at both laboratories are in good agreement, except for the samples from site SA08, which are highly scattered. In total, 89 out of 114 results passed the selection criteria. Most of the rejected results are from samples with reversed polarity. At 16 sites, three or more successful results were obtained. Mean paleointensities of those sites range from 11.8 to 39.5 micro T, corresponding to virtual dipole moment of 2.9 to 9.8 $*10^{22}$ Am^2. Thermomagnetic analysis in vacuum is also conducted on selected samples using the Curie balance at Kyushu University. For all samples, the thermomagnetic curves are reversible in general, with the cooling curves more or less below the heating curves. First derivatives of the thermomagnetic curves indicate single component magnetic mineralogy with a Curie point of about 550 ℃.

To the best of our knowledge, this is the first study to report the absolute paleointensity during the past 1 million years from the East Africa, which will contribute to our better understanding of the global pattern of the geomagnetic field variation. In the presentation, comparison with coeval data from different areas and results from older ages of the same area (Ahn et al., 2016; Yoshimura et al., 2020) will be discussed.