Verification of reducitive chemical demagnetization effect on the sedimentary rocks from the Kokumoto Formation, Kazusa Group, Boso Peninsula

*Takahiro Kitamura[1], Makoto Okada[1], Yuki Haneda[1], Chisato Anai[2], Hidetoshi Shibuya[2]

1. Ibaraki University, 2. Dep't Earth & Env. Sci., Kumamoto Univ.

The Matuyama-Brunhes boundary (M-B boundary) has been confirmed in the Chiba composite section which is the lower-middle Pleistocene boundary GSSP candidate site composed of the Kokumoto formation, Kazusa Group, and paleomagnetic studies have been actively conducted. During a geomagnetic polarity transition, since the geomagnetic intensity remarkably decreases, the primary magnetization is generally recorded very weakly in sedimentary rocks. In the Kokumoto formation, it is cosidered that chemical remanent magnetization due to the magnetic mineral made secondarily is responsible for the secondary magnetization, and it is impossible to separate the primary and the secondary magnetizations by alternating field demagnetization (AFD). On the other hand, in the thermal demagnetization (TD), the secondary magnetization is successfully demagnetized by heating at 400 ℃ or more, but due to the thermal decomposition of magnetic minerals, additional magnetic minerals are newly generated during demagnetization, so that the relative paleointensity can’ t be restored. Okada et al. (2017) restored magnetostratigraphy by combination demagnetization (TD in 300 ℃ + progressive AFD) to avoid thermal decomposition of magnetic minerals. However, minerals that cause secondary magnetization remain in the specimen, and there is a possibility that it may hinder the restoration of the primary magnetization as noise. Therefore, in this research we attempted chemical removal of minerals responsible for secondary magnetization by reductive chemical demagnetization (RCD), a method established by Anai et al. (2017).
In this study, RCD was performed on 4 samples collected between the Byk-E and Byk-A key tephra beds, in which the directional polarity reversal corresponding to the M-B boundary was confirmed in Okada et al. (2017). For RCD, an etchant solution whose pH was adjusted with sodium bicarbonate in a 5 % ascorbic acid aqueous solution was used. Thermomagnetic measurements in air were carried out on samples for both of subjected and not subjected to RCD and the sample not subjected to RCD. RCD s were performed by dropping a solution onto two samples out of four samples and immersing the remaining two samples in a solution. Then, thermomagnetic measurements were carried out again on samples for both of subjected and not subjected to RCD. In all the samples not subjected to RCD, the saturation magnetizations which showed gradual decreasing with increasing temperature rose greatly at around 400 ℃. On the other hand, in samples subjected to RCD, it was observed that the increase in saturation magnetization at around 400 ℃ was suppressed. These results suggest that minerals related to thermal alteration is eluted by RCD, and dripping is better than dipping as a method of RCD.

Keywords: Reductive chemical demagnetization, chemical remanent magnetization, Matuyama-Brunhes boundary, Chiba composite section

