

Absolute paleointensities from the Younger Ontake volcanic rocks - evidence for geomagnetic excursion at 80 ka

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Following the paleodirectional study (Tanaka and Kobayashi, this session), we have tried absolute paleointensity measurements on volcanic products of the Younger Ontake Volcano. They will provide good calibration points for secular variation curves of relative paleointensity, since detailed K-Ar ages of the products are already reported as 21-84 ka with small uncertainties within +/- 25% (Matsumoto and Kobayashi, 1995).

Judged from thermal and alternating field demagnetization results, main remanence carrier is considered to be titanomagnetite with minor Ti content. This is confirmed by low and high temperature magnetometry for the selected samples. Hysteresis parameters of other selected samples revealed that most of them had PSD characteristics, though ratios of H_{cr}/H_c for some samples were beyond the value of PSD-MD threshold ($H_{cr}/H_c=4.0$). These evidences indicate that the samples in this study have ordinary rock magnetic properties for paleointensity measurements.

Therefore, we have performed two different methods of the measurements; Coe's version of the Thellier method (Coe, 1967), and double heating technique of the Shaw method combined with low temperature demagnetization (LTD-DHT Shaw method; Tsunakawa et al., 1997; Yamamoto et al., in press). Until now, the former has been applied to 63 specimens from 25 sites while the latter to 41 specimens from 24 sites. Each method gave 28 and 12 successful results, both of which ranged from 4.5 to 63.6 microT and from 5.6 to 32.2 microT, respectively.

Among these results, samples from two outcrops, which are 20 m apart across a gully, gave consistent results in both methods for the site recording intermediate direction at 80 ka (OT33; VGP at 15.9 deg N and 183.3 deg E). In the Thellier method, 4 out of 8 samples yielded a mean of 4.9 ± 0.4 microT. In the LTD-DHT Shaw method, a mean of 5.9 ± 0.2 microT was obtained from all three samples. Corresponding VDM and VADM, which is calculated to be about 1×10^{22} Am², is about 12% of the present value and is typical for the geomagnetic excursions. Therefore, the existence of 80 ka excursion is confirmed not only from the paleodirectional evidence but also from the paleointensity data.