

Paleomagnetism of Late Tertiary lava flows from Lundarhals, Stortjarnir, and Sudurdalur, Iceland

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Paleomagnetic sampling of Tertiary lava flows was carried out by our group (Tokyo Institute of Technology, Kochi University, University of Tokyo, University of Iceland) in 1993 and 1994. In total, 489 lavas were sampled. For paleomagnetic purposes, five oriented cores were obtained at each site. In the laboratory, one specimen from each core was subjected to stepwise alternating demagnetization. For about 20 % of all samples, 10 steps with a maximum of 50 mT were employed. For the other samples, the demagnetization was done in 15 steps to a maximum field of 100 mT. For some selected samples, hysteresis and thermomagnetic analyses were carried out to characterize the magnetic minerals. The Curie temperatures ranged between 200 and 600 degree C, suggesting that the carrier of remanent magnetization are titanomagnetites with various degrees of oxidation. Characteristic remanence directions were determined by principal component analysis. For some of the lava flows, K-Ar dating was carried out at ISEI, Okayama University.

These experiments were carried out through the years 1994–2004, but most of the measurements were finished by 2001. The publication of the results were, however, much delayed for various reasons. Only the results for Jokuldalur section (38 lava flows) was published (Udagawa et al., *Phys. Earth Planet. Inter.*, 115, 147–171, 1999). In this study, we found the evidence that the Gilsa event is, although short, a distinct short normal period separate from the more prominent Olduvai event. In this talk, I would like to summarize the paleomagnetic results from other areas of Iceland.

In Lundarhals area, which is in the western Iceland north of Reykjavik, we collected samples from 182 lava flows belonging to nine continuous sections. The age of these lavas are considered to be 4–6 Ma, based on magnetic stratigraphy. The remanence in this area are dominated by reverse polarity. Only in one section (VM), the number of normal and reversed lavas are about equal. There are three other sections in which short normal period was found (VS, VT, VB). In all the other sections (VA, VC, VD, VF, VG), all the lavas showed reverse polarity. It may be that these sections represent relatively short period of time dominated by reverse polarity.

Two sections were sampled in Stortjarnir. Some of these samples were dated by K-Ar method and gave the ages of 2–4 Ma. The LT section is composed of 93 lava flows, and showed R-N-R-N-R-N-R-N polarity changes from bottom to top. Among them the upper two reverse polarities were recorded by one flow each. The SI section (77 lavas) showed R-N-R-N from bottom to top. These two sections are about 3 km apart and taken from the gulleys cutting the same mesa-like plateau, but exact correlation of flow to flow was very difficult even with the use of magnetic directions, lithology, and K-Ar dates. This may be showing that the volcanic activity of one center is rather limited, even when seemingly continuous and nearly flat hills continue for several kilometers.

Two sections were also sampled in Sudurdalur area. The age of the lavas are presumed to be 4–6 Ma based on magnetic stratigraphy. In MA section (47 lavas), a R-N-R-N-R (bottom to top) sequence was found. The MB section (52 lavas) is stratigraphically younger than the MA section, and exhibits R-N-R-N-R-N-R section. These two sequences should overlap about 1/2 to 2/3, but exact correlation is not possible yet.