

Paleomagnetism of Harutagawa formation in Pliocene Kuju-Bepu tectonic basin

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The Beppu-Shimabara graben in the Hohi Volcanic Zone (HVZ) in northeastern part of Kyushu Island, Japan is thought to be a volcano-tectonic depression. Volcanic stratigraphy and age studies of the area have unraveled the late Pliocene structural formation history of HVZ (e.g. Kamata, 1994, Kido, 2007). The age and sedimentation rate of lacustrine deposits in HVZ is one of the keys for interpreting the temporal relation between the formation of Beppu-Shimabara graben and the huge pyroclastic flows appeared in the area. We study the magnetostratigraphy of the Harutagawa formation, which is one of those lacustrine deposits. The formation is dominated by conglomerates and mudstones to siltstones, in the lower and upper parts, respectively, but bears many tuff layers all over the formation. Fission track ages of two tuff layers, one is from lower part and the other is from upper part of Harutagawa formation, are determined as $3.86 \pm 0.77\text{Ma}$ and $3.6 \pm 0.2\text{Ma}$, respectively (Kido, 2007).

Samples for paleomagnetic analyses have been collected at 28 sites in several continuous outcrop of the Harutagawa formation. The sites are set to be spaced equally in the stratigraphy. Samples were collected by a portable electric motor drill. A few pilot specimens from each site are subjected to progressive thermal and alternating field (AF) demagnetization. However, AF demagnetization is not effective. All remaining specimens are, therefore, submitted to the progressive thermal demagnetization. The samples have mean magnetic intensity of $1.7 \times 10^{-4}\text{A/m}$ and $7.7 \times 10^{-5}\text{A/m}$ before and after demagnetization, respectively. Samples from 6 sites have no stable component or are thought to be completely remagnetized by the present magnetic field. As the result, 42 sites are determined their polarities; 24 were reversed and 18 were normal. The normal polarity sites were correlative to Gauss polarity chron and the reversed polarity sites were correlative Gilbert polarity chron. This correlation indicates that the Harutagawa formation deposited in less than 0.75m.y. It gives a sedimentation rate of 240m/my, which is rather slow for formation of those faces.