# Magnetic survey at the 2000 Eruption area of Usu volcano, Hokkaido, Japan

# Tetsuji Koike[1]; Hiroshi Hasegawa[1]; Ikuko Fujii[1]; Takeshi Hashimoto[2]

[1] Kakioka Magnetic Observatory; [2] Inst. Seismol. Volcanol., Hokkaido Univ.

http://www.kakioka-jma.go.jp/

The eruptions at Usu volcano started on 31 March 2000, and was over in 2001. But the fumaroles activity still continues at N-B crater and north-western geothermal zone in Nishiyama craters area.

Some groups conducted aeromagnetic and ground magnetic surveys in Usu volcano after the 2000 eruption, however, a ground magnetic survey of the whole Nishiyama craters area has not been carried out yet.

The ground magnetic survey took place in the Nishiyama craters area from 5 to 6 July 2006.

The G856 type of proton-precession magnetometer made by Geometrics was used. The proton sensor was connected to an aluminum pole and was installed at 2.0m high from ground.

The survey area is located in lat. N42$^o$33’10” - N42$^o$33’30” and long. E140$^o$47’50” - E140$^o$48’20” which includes the N-B crater and the north-western geothermal zone. The number of magnetic total field observation sites is 105. At each observation site, we measured the magnetic total field in about three times and averaged them. For the reference purpose, a overhauser magnetometer Gemsys GSM19 was set up at 1.5km northwest.of the geothermal zone.

Our magnetic survey results are summarized as follows:

1. Strong negative anomaly (about 2000nT) in the west side of the geothermal zone.
2. Broadening negative anomaly form the geothermal zone to the east without correlation to geographical features.
3. Negative anomaly zone surrounded by N-C, N-12 and N-18 craters at the southern part of the geothermal zone, which is correlated to geographical features.
4. No anomaly near the N-B crater, where the fumaroles activity is shown.

The first and third anomalies correspond to the estimated demagnetized points by the Hokkaido University group. And the first anomaly was also reported by Okuma(2002) and Takakura(2004).

A 3D numerical modeling by using magnetized prism blocks was applied to the strongly anomalous area in the west side of the geothermal zone to investigate the magnetization structure beneath the anomaly.

The numerical calculation result shows that demagnetization of about 2A/m at the minimum is required at a layer from 10m to 70m below the ground. Takakura(2004) claimed that the demagnetization from 15m to 200m below the anomalous zone and the strength of the demagnetization is 10A/m, which is significantly different from our result.