

Low Magnetic Anomalies Observed Locally at the Nishiyama Crater Area, Usu Volcano, Hokkaido, Japan

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The Geological Survey of Japan, AIST had conducted a high-resolution aeromagnetic survey over Usu Volcano, Hokkaido, Japan to better understand the subsurface structure of the volcano with a special reference to the Usu 2000 eruption. The resultant aeromagnetic anomaly map revealed magnetic lows are dominantly distributed in and around the Nishiyama crater area, implying a correspondence to a distribution of reversely magnetized Tertiary volcanic rocks which outcrop mainly in the northwest of the crater area as well as the existence of shallow intruded magmas. However the origin of the magnetic lows is unclear.

Therefore, in November 2001 we conducted a ground magnetic survey in the Nishiyama crater area and a rock sampling for rock magnetic measurements in the surrounding areas. We employed a proton magnetometer to measure the total magnetic intensity at an interval of 2.5 m along two survey lines (Line-A and Line-B) traversing the N-C crater area in a direction of NE-SW. The line lengths of two survey lines are approximately 600 m for Line-A and 300 m for Line-B. We employed a DGPS system for positioning of node points and a measuring tape for positioning between each node. Daily-variation of the Earth's magnetic field was also observed by another proton magnetometer and removed from the magnetic anomalies.

The resultant magnetic profiles showed local magnetic lows exist and correspond remarkably to fumarolic areas in a direction of NW-SE. Further magnetic modeling with taking account of rock magnetism is necessary.

We collected rock samples from a newly found outcrop of presumably Tertiary volcanic rocks, outcrops of the Usu somma lava and Takinoue welded tuff for rock magnetic measurements. A preliminary result indicates the Usu somma lava and Takinoue welded tuff show normal and reverse magnetization, respectively. The NRM of rock samples from a newly found outcrop of presumably Tertiary volcanic rocks shows a downward inclination with a westward declination. However, we need to conduct a demagnetization of the NRM to confirm if it is secondary or not.