

Application of the generalized mis-tie control method to detect magnetic anomaly change associated with the volcanic activity

Tadashi Nakatsuka[1]; Mitsuru Utsugi[2]; Shigeo Okuma[1]; Yoshikazu Tanaka[3]; Takeshi Hashimoto[4]

[1] GSJ, AIST; [2] Kyoto Univ.; [3] Aso Volcanological Laboratory Kyoto Univ.; [4] Inst. Seismol. Volcanol., Hokkaido Univ.

Aeromagnetic survey is expected to contribute to the elucidation of the volcanic structure and the change of its activity. However, the track lines of repeated surveys cannot be the same, and the inspection to the repeatability and the spatial alias effect of magnetic anomaly pattern is quite important to acquire valid information of the activity. To overcome this difficulty, we applied the generalized mis-tie control method (Nakatsuka and Okuma, 2006).

Asama Volcano 2005 aeromagnetic survey was conducted by the Asama Volcano EM Field Experiment Group, in October, 2005 (Utsugi et al., 2006). The existing reference data is the survey by the Geological Survey of Japan in 1992 (Okuma et al., 2005). Although the track lines were fixed by GPS system in both surveys, the position fix in 1992 survey was not accurate enough because the number of satellites was insufficient, the differential technique had not been developed yet, and the radio signal was contaminated with military selective availability scheme. This situation brings an error in estimating the magnetic anomaly change. After taking into account of this error effect and other error sources in the analysis, we detected characteristic features as a considerable change exceeding the expected error level, and it was proven that the spatial alias effect could be reduced by the generalized mis-tie control method. Also we confirmed the stability of our method of analysis, by applying it to the realistic model anomalies synthesized from actual 2005 survey data.