Detection of aeromagnetic anomaly change by the method of generalized mis-tie control - Application to Asama Volcano 2005 data

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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 investigated the method of retrieving the magnetic anomaly change. We applied a technique of generalized mis-tie control, and it was proven that the spatial alias effect could be mitigated by this technique (Nakatsuka and Okuma, 2006). This method was applied to the actual data of Asama Volcano 2005 survey.

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, published as the High-resolution Aeromagnetic Anomaly Map of Asama Volcano (Okuma et al., 2005). The year 1992 is situated in the midway of Asama activities in 1982-83 and 2004, and the 2005 survey was soon after the 2004 activity. In the 1992 survey, survey lines of 150m spacing with terrain clearance of 200m were flown, while the observation surface of 2005 survey is selected to be of calm slope at the elevation of 2000-2500m, much higher in mountain foot areas. Both data revealed similar magnetic anomaly pattern as a whole, indicating no drastic structural change during these years.

The result of our analysis of generalized mis-tie control revealed the increase of magnetic anomaly value at summit area, the decrease in the SE part of Yunotaira, and the irregular disturbances around Kengamine-Kibayama-Yunotaira region.