Microtopography analysis using LIDAR altimetry data in the Hachimantai area

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In the Sengan geothermal area, between Iwate and Akita prefecture, four active volcanoes are located which are Iwate, Akita-komagatake, Akita-yakeyama and Hachimantai volcano. The volcanic disaster prevention about three volcanoes except for Hachimantai have been proceeding, and their volcanic hazard maps have already prepared. Since the investigation of the Hachimantai Volcano as active one has just been started after recent report (Wachi et al. 2002), the examination of the volcanic disaster prevention has also been carrying out. In that study, it was clarified that the craters of the Pond Hachiman and Pond Gama around the gentle peak of the Hachimantai Volcano were formed by the volcanic activity about 6,000yBP, in comparison to the Kikai-Akahoya tephra.

May 1997, the phreatic eruption and the landslide simultaneously occurred at the Sumikawa Hot Spring. Since the Hachimantai area was well known as a major landslide area in Japan, it could be occurred phreatic eruption related to landslide similar to the Sumikawa Landslide in the past. There should be discussed as important problems of regional disaster prevention.

In order to solve their problems at the Hachimantai area, we surveyed detail topography using LIDAR (LIght Detection And Ranging) with 1m-grid-DEM without tree effects. The DEM data was translated into RRIM (Red Relief Image Map; Patent pending) to analyze the microtopography. Survey area was about 200km2 (17km EW, 11.5km NS).

RRIM revealed the fact as follows, 1) small craters over nine at southern side of Pond Gama and Pond Megane, 2) faults across east to west at the gentle peak of the Hachimantai Volcano and other volcanoes, 3) possible craters about seven or eight at eastern side of Gozaisyo Hot Spring nearby ex-Matsuo Mine. Much detail shapes of landslide block and cliff also be found.

We would introduce some new knowledge our study. We think that RRIM translated from LIDAR can be used widely in many fields, as well as applicable survey of volcanic history and landslide mechanism.

This paper is a part of the report from investigation of the history at the Hachimantai Volcano, Iwate Office of River and National Highway, Tohoku Regional Bureau, Ministry of Land, Infrastructure and Transport.

Reference

Takeshi Wachi, Tatsuro Chiba, Tomoyuki Okada, Nobuo Doi, Shin Koshiya, Shintaro Hayashi, Shuichi Kumai (2002) Discovery of the Holocene tephra sourced from the Hachimantai Volcano. Abstract 2002 Japan Earth and Planetary Science Joint Meeting.