

Detection of subtle lava flow morphology in densely forested areas by airborne LiDAR survey and Red Relief Image Map

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The vast increase of the volume of three dimensional topographic data acquired by Airborne LIDAR extends the possibility of the visualization method. High resolution three dimensional topographic data potentially holds useful information which can not be expressed by ordinal visualization method. We have developed Red Relief Image Map (RRIM) for an interpretation of micro topography. This new visualization method is based on multi-layered topographic information computed from gridded three dimensional data (DEM). RRIM can visualize the topographic slope, concavities and convexities at the same time. In this study, we will show a microtopographical image of lava flow at Fuji volcano in Japan. We executed detailed surveys and analysis for the micro topography of Aokigahara lava flows erupted in 864 to 868 on the north western slope of Fuji Volcano using airborne LiDAR survey and Red Relief Image Map. New crater at the 864 to 866 eruptions named "Kudariyama crater" was found to the WNW of "Ishizuka crater" by this analysis. "Kudariyama to Ishizuka craters" and "Nagaoyama to Koriike craters" were formed at the northwestern slope of the volcano in the 864 to 866 eruptions. The linear graben structures on the lava flows ranging, 2-5 km in length must have been made by the collapse of the roof of lava tunnels. These structures suggest several lava tunnels must have been existed beneath the flows. These lava tunnels play an important roll to transport molten lavas from source craters to the front of flows, especially in large scale eruptions. We are not able to obtain this information from a classic photointerpretation and topography map reading technique. Therefore, airborne LiDAR survey and Red Relief Image Map are indispensable for a volcano topography investigation in densely forested area. The application of RRIM is not only LiDAR data but also wide variety three dimensional data such as SRTM3, GTOPO30 and ETOPO2.