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SVC49-P07 Room:Convention Hall Time:May 19 18:15-19:30

Terrain analysis of an active volcano using oblique photogrammetry

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Volcanic eruptions often cause topographic changes, such as the destruction of an edifice due to an explosive eruption. For volcanic hazard mitigation, it is important to quickly measure these topographic changes. When a volcano erupts explosively, an airplane cannot fly directly over a crater to carry out aerial photography and LiDAR measurements. In order to obtain information regarding topographic changes, we can take many oblique aerial photos from an airplane and a helicopter, but it is difficult to obtain spatial information such as the spread area of pyroclastic flow deposits from oblique aerial photos. Therefore, we have developed a new system for real-time monitoring of volcanic activity. Our system can generate a three-dimensional model from many oblique photos. The three-dimensional models are generated by an image correlation method. From this data, we can estimate the volume of ejecta and analyze topographic changes. We analyzed a lava dome from the 2011 eruption of Shinmoedake volcano, Kirishima volcanic group, Japan. We measured the elevation of the summit of the lava dome and the distance of the lava spread area, and estimated lava thickness from cross sections generated from the three-dimensional data. Our measurements were consistent with results of airborne synthetic aperture radar (SAR) and photographic surveying using oblique aerial photographs. The accuracy of this system is sufficient for effective volcano monitoring. This system can be used to conduct a time series analysis of the formation and movement of craters or growth of lava dome.

Keywords: oblique photogrammetry, active volcano, terrain analysis, modelization, disaster prevention, disaster investigation

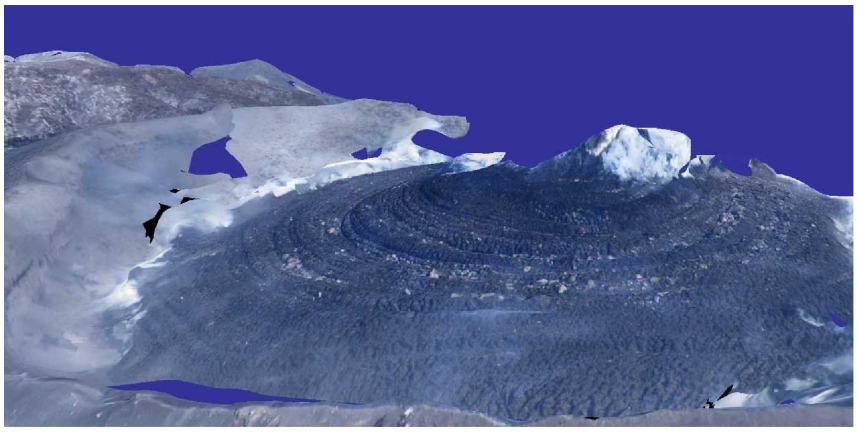

Fig.1 Three-dimensional model generated from oblique aerial photo

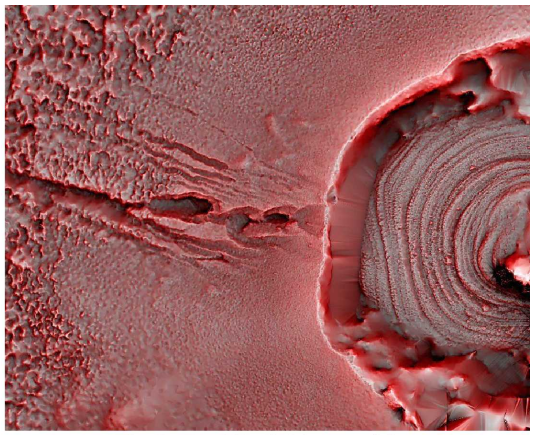

Fig.2 Red Relief Image Map