Estimation of ground movement around the 62-2 Crater of Tokachi-dake Volcano from the Geomorphic Image Analysis of Differential LiDAR DEM

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In this study we estimated ground movements in around the 62-2 Crater of Tokachi-dake Volcano where ground movement was suggested by InSAR and GNSS observations of some research institutes, using the Geomorphic Image Analysis of differential LiDAR DEM from 2009 through 2015. And we tried to estimate the hazardous area of slope failure and debris flow area, concerned with ground movement or volcanic activity.
The topographical data used in this research is two times of 2mDEM by the airborne laser survey in 2006 and 2015. And the gray-scale gradient slope angle map was provided for Geomorphic Image and the existing software for PIV analysis was used for image matching analysis, and the results were combined with vertical component calculated from multi-temporal DEM.
The range of the ground movement for six years estimated by the Geomorphic Image Analysis is almost conform to the result by InSAR of most recent one year and the results of the nearest GNSS observations for these past several years.
These results indicate the ground deformation by volcanic activity around the 62-2 Crater of Tokachi-dake Volcano continues recent years. However, large displacement in a wide area was not observed in this study. And it may be said that the sign of the large-scale slope failure around Mae-Tokachi, suggested by the accumulation of the displacement by GNSS observations, couldn't be confirmed in this stage.

Keywords: Volcano, Airborne LiDAR, Differential LiDAR DEM analysis, Image matching analysis

