

HDS027-P13

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## Study on the feature of the landslide using GPS monitoring and LiDAR DEM

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The landslide disaster occurred at Shimekake district in Yamagata Prefecture on the snow melting period in 2009. We studied on the form feature and the movement style of the landslide from distribution of the ground surface cracks, the continuous GPS observation, and the comparison analysis using LiDAR DEM of two times.

This landslide is located in the northwest of Gassan-Volcano. The green tuff, sedimentary rocks, and the dolerite of Neogene are underlying in the surrounding area.

The cracks on the crown of landslide were found in the residential area on February 25. Afterwards, the movement continued until the beginning of July, and many cracks were formed to enclose the landslide area. Afterwards, the movement has decreased since July 8.

The subsidence zone was caused on the head of landslide in the direction of E-W. On the western side of the movement area, cracks were caused in parallel in the direction of the southwest. On the eastern side, cracks with bump were formed in parallel. In the part of southwest, the rice field upheaved and tilted due to strike-slip cracks with bump.

Only the GPS observation followed to the rapid and large movement. The maximum of the amount of the accumulation displacement reaches 4.2-6.2m (15cm /day) in the beginning of July. Main body of this landslide moved toward south, and on the toe of landslide, moving direction changed to eastward.

The displacement vector was analyzed with the method of Digital Geomorphic Image Matching Analysis. The center part of the movement block moved toward south about 5m for five years. The place of changing displacement value is corresponding to the part where cracks were remarkable on the ground surface.

This landslide is rock glide type that platy body slide down on the plane. The landslide movement was strongly controlled with geological structure of Neogene strata. Landslides with large movement like this landslide are well observed with GPS and LiDAR.

Keywords: GPS, LiDAR, landslide, disaster, snow melt period