

Topographical interpretation of landslides using the LiDAR DEM in the Gamaharazawa area in the northern Fossa-Magna region

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Introduction

According to the development of LiDAR, the distinction of micro-ruggedness in a surface is possible where interpretation is difficult in photogrammetry. Therefore, a more highly accurate topographical map can be made. Topographical interpretation of a landslide using LiDAR DEM was carried out, in the Gamaharazawa area in the northern Fossa-Magna region. In this report, we introduce a topographical feature that became clear from the current interpretation result.

Study Area

Around the investigation area, the Fossa-Magna runs along the Himekawa River which is the main river. The activity of the Fossa-Magna influences the investigation area and surrounding area. Based on this influence, the landslide area has been overcrowded around the investigation ground. Geology of the study area is underlain by Paleozoic clay stones in the lower reach and by the serpentine rock in the upper reach. In the more upstream, an alternation of strata of the conglomerate, sandstone, and the mudstone called the Kuruma formation is distributed. And, the Kazahuki volcanic product of the Quaternary period covers on those.

Method

The resolution of the LiDAR DEM used in the study was 1m. By using this DEM, a hillshade map, a slope gradation map, and a contour line map with 1-m intervals were made. The software used was ArcGIS ver9.1 and ENVI ver4.3. The topographic classification was carried out while comparing it with the decipherment results of the aerophotograph. Additionally, some of the geographical features that were identified in the study were investigated in the locale.

Results and Discussion

Many small-scale landslide scarps, many linearments and some linear depressions were confirmed from the obtained maps. Many of these were not able to be confirmed by the aerophotograph decipherment. Some of the confirmed linearments were distributed like crossing landslide scarps. On the curve of scarps where they were shown, the shapes were transformed near the lineaments. On these maps, some of these lineaments were formed on a straight line in the direction of NNW - SSE. In the field investigation, the fault or slip surface thought to accompany it was observed from an outcrop near the place where transformed shapes were observed. South of the investigation area, an active fault called the Kamishiro fault exists, and the investigation area is on the extension line of this fault. Therefore, it suggested the possibility that the Kamishiro or accompanied gravity fault influences these linearments.