

Formation age of uphill-facing scarp and linear depression discovered in the northwest area of the Gamaharazawa basin.

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1. Introduction

As a result of the development of high-accuracy measurement using LiDAR, it is possible to distinguish micro-ruggedness in a surface. We carried out topographical interpretation of events such as small-scale landslides, for which interpretation by photogrammetry was difficult, using LiDAR DEM in the Gamaharazawa basin in the northern Fossa-magna region (Murakami et al., 2008). This topographic classification included the interpretation of an uphill-facing scarp and linear depression in the northwest area of the basin. In this report, we present the results of field survey based on this topographic classification.

2. Study Area and Method

Around the investigation area, the Fossa-Magna runs along the Himekawa River which is the main river in the area. The activity of the Fossa-Magna influences the investigation area and the surrounding area. In the investigation area, many small-scale landslide scarps and lineaments were found in the landslide mass of a large landslide using the hillshade and slope gradation map made from the LiDAR DEM.

The reported uphill-facing scarp and linear depression could not be interpreted using photogrammetry. Therefore, we surveyed the found point in the locale, and confirmed existence. Portable measurement was carried out on the site with handy laser-distance meters. Also, the soil was investigated in the linear depression, and buried humic soil was discovered. We gathered the buried humic soil, and its radiocarbon age (C14) was measured using the radiometric technique by The Beta Analytic Co. in the US.

3. Results

The discovered uphill-facing scarp and linear depression exist on the opposite slope of the boundary (ridge line) in the northwest part of the basin. The uphill-facing scarp and linear depression were formed almost in the N-S direction. These lengths of both the scarp and depression were about 300m. At the measured points, the height difference measured by the handy laser-distance meters was about 4 m. The linear depression turned right (toward east) at the edge of the north, stepped over the ridge, and joined one of the branches in the Gamaharazawa river.

The radiocarbon age (95 percentage probability) the buried soil that was gathered was 1370-1180 cal yrs BP (Beta-253548). Therefore, it was estimated that the uphill-facing scarp and linear depression had been formed before 1370-1180cal yrs BP ago. Records of the surrounding seismic activities or disasters have been investigated using the existing data, and it was reported by Okumura et al. (1996) that the Kamishiro active fault was active as far back as 1500-1000 years ago. Aside from this one report, no record of seismic activities or disasters in that time periods has been reported around the study area. For this reason, there is a possibility that the uphill-facing scarp and the linear depression were formed as a result of the activity of the Kamishiro active fault.

4. Topics for future study

Because the study area is located in a landslide zone, there is also a possibility that the uphill-facing scarp and the linear depression were formed by more regional activities such as landslides. Therefore, more detailed field surveys such as gathering the C14 samples are necessary.