Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

HGM021-P01 Room:Convention Hall Time:May 24 16:15-18:45

A Geomorphic interpretaion of the inundation history as fluvial response to intervention in the mid-Arakawa

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Both natural processes as big floods and artificial works as embankment, dam construction and gravel excavation were considered intervention to the fluvial system. The inundation history can be geomorphologically interpreted as response of fluvial system to the intervention. Case studies were carried out in the middle reach of the Arakawa, central Japan. Big floods brought sedimentation in a wide range of the alluvial fan. It was followed by big erosion in the fan, which supplies sediments downstream. On the other hand, both embankment and gravel excavation induce abrupt lowering of river bed. The effects of gravel excavation appear in rather limited reach and disappear soon after the work was over, while the effects of embankment continue long.

Keywords: River bed fluctuation, Human-impact, Flood history, Equilibrium, Mid-Aarakawa

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Interpretation of landscapes in tectonically active areas using 5 m DEMs from airborne laser scanner data

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GSI is developing the generation of 5 m DEMs from airborne laser scanner (LiDAR) data and the publication of the data as a part of the Spatial Information Infrastructure. Ground conditions under trees or buildings can be observed by the LiDAR 5 m DEMs. Thus the DEMs enable users to grasp little differences in height in residential areas or terrains under forests.

In the work of 1:25,000-scale Active Fault Map in Urban Areas around Nagai Basin in Yamagata Prefecture, we created the color elevation slope images and the anaglyphs, and studied the application possibility of the 5 m DEMs to the classification of terrains such as landslides, terraces, and fans. Moreover, we compared the digital images derived from the LiDAR DEMs and a terrain classification map (the 1:25,000 Active Fault Map of the 2008 Iwate-Miyagi Nairiku Earthquake ”Kurikomayama”) created by airphoto interpretation.

The anaglyphs with emphasized heights were useful for interpretations of relatively flat areas, i. e., interpretations of tilting terraces by active faults, former cannels, and natural levees. The anaglyphs without emphasized heights were excellent to interpret landslides in mountains. The LiDAR 5 m DEMs are most appropriate to interpret middle-scaled terrains, and may be enhanced by the combination with more large-scaled aerial photographs.

Keywords: active fault, landslide, tectonic geomorphology, DEM, LiDAR

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Assessment of landslide susceptibility using landslide map

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The slope where the landslide occurred move easier than the surrounding slope, because the slip surface was formed under the slope. The slope where the landslide occurred is called the landslide topography. We think that by analyzing the landslide topography we can assess the landslide hazard. National Research Institute for Earth Science and Disaster Prevention (NIED) published the landslide map in Kyushu Island, Sikoku Island and the main island in Japan. The objective of this research is to clarify geological and geomorphological features of landslide topography in some areas by analyzing the landslide map of NIED for the assessment of landslide susceptibility.

Two methods exist in the assessment of landslide susceptibility that used by landslide map. One is the method of individual landslide assessment for re-activity, the other is the method of the wide area landslide assessment used by the features and distributions of landslide. In this research, we analyzed landforms in Ojiya area, Niigata Prefecture, Japan for individual landslide assessment and in Sikoku island, Japan for the wide area landslide assessment. The reason to select these area is as follows. In Ojiya area, many landslides occurred in 2004 Chuetsu earthquake, and the landslides are already mapped in detail. Sikoku Island seem to be comparatively easy to show geographical and geological landside features because the geologic structures is simple, and landslide distribution is different in each geological units.

We showed the concrete example of each methods of landslide assessment in this research. In the future, we want to assess the landslide susceptibility that accuracy is more high-resolution and better by adding some parameter respectively.

Keywords: Landslide, Landslide map

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Observations of freeze-thaw cycles on rock surfaces in low maountain area

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Rock-surface temperatures were measured on a tor and a large block located below the timberline in the Kobugahara Highlands, an upland plateau composed of granodiorite in central Japan (1300 m a.s.l.). Many blocks in the region originate from core stones distributed on the plateau, and there are several block streams in the valley bottoms. The tor is situated at the upper end of one of these block streams. The large block appears to have detached from another tor. The mean air temperature of the coldest month is -4 celsius degree. Rock-surface temperatures were recorded continually every 30 minutes from December 1, 2002 through December 13, 2004 by thermistor probes connected to miniature data loggers. The results showed that each year can be divided into four periods: (1) a period with no freezing between April and the first half of November, which forms the first part of an annual FTC; (2) a period with diurnal FTC between the second half of November and the end of December; (3) a period with permanent subzero temperatures during January and February, which forms the second part of the annual FTC; and (4) a second period of diurnal FTC during March. These periods can be recognized in other regions, and the length of each period is affected by the latitude, altitude, and local environment.This study revealed that a freeze?thaw environment exists on rock surfaces below the timberline. It is clear that annual changes in the freezing index are large, and that there are large variations in the numbers of FTC and EFTC within the same area. These differences are primarily caused by differences in the depth of snow cover.The diurnal and the annual freeze thaw cycles and effective freeze thaw cycles were recorded at each site. The freezing index of rock-surface temperature showed a marked variability from year to year. In addition, differences in local conditions at observation sites within a given area greatly affected the rock surface temperature. These are important considerations in relation to local weathering below the timberline.