Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HDS25-01 Room:101A Time:May 28 09:00-09:15

The Madi River flood events due to glacial-ice avalanches from Mt. Lamjung, Annapurna

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Two flood events occurred in 2003 in Madi river, southeastern basin of the Annapurna massif. These events have been listed by previous study as the latest event of glacial lake outburst flood (GLOF) in the Nepal Himalayas. According to checking satellite images and field survey, this flood is not GLOF phenomenon but rather glacial-ice avalanche induced flood. Because, a glacial lake which was suspected as the breached lake was actually appeared from 2005 to 2008. The present outlet condition of the glacial lake also has not braked channel which is a evidence of GLOF event in the past. Furthermore, a devastated river bed leading out of the avalanched valley (eastern branch) was confirmed in field survey in 2014.

In this presentation, we will also make mention following result and recommendation,

- In the Nepal Himalayas, GLOF from moraine-dammed lake, which is one of the typical disaster in the asian wet-tectonic zone will be not frequent disaster in future.
- Multiple caution and monitoring for the flood from glacial ice avalanche due to glacial snout calving and water body rupture in debris-covered glacier are required.

Keywords: glacier snout calving, GLOF, global warming, satellite image, Nepal, Himalaya Mountains

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HDS25-02 Room:101A Time:May 28 09:15-09:30

Dammed-lake sediments caused by the Shichimen-zan landslide in the late Heian period, Southern Japanese Alps

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The Shichimen-zan landslide (SMZ) is a large bedrock slide occurred on the east side of Mount Shichimen-zan in Southern Japanese Alps (35.3704N, 138.3504E, 1983 m ASL). Geology of the SMZ is mainly composed of late Eocene to early Miocene west-dipping sedimentary rocks. A previous study revealed that the SMZ was already present in 1600s by analyzing the local historical documents. However, the timing of onset and landscape evolution of the SMZ have not been exactly known. For better understanding of geomorphological and geological development of large-scale landslide like the SMZ, the author investigated the local geology in and around the SMZ. Consequently, lacustrine sediments composed of fines with standing trunk of trees near the toe area of the SMZ. Three radiocarbon ages of wood fragments in the lacustrine sediments (L1 and L2) and debris flow deposits (D1) which cover the lacustrine sediments indicated cal AD 1057-1075, 1153-1225 and 1231-1245 (L1), cal AD 1034-1164 (L2), and cal AD 1438-1514 and 1598-1618 (D1), respectively. These ages show that a dammed lake had been present around AD 1055-1160 (as the late Heian period in Japanese history). This paleolake would have been formed by channel blocking associated with an ancient large landslide of SMZ. Later, a debris flow event occurred. Although a trigger of the large landslide of SMZ is uncertain at present, the AD1096 mega-earthquake generated from the Suruga-Nankai troughs is possible.

Keywords: Large-scale bedrock landslide, Landslide dam, Plant macro fossils, 14C age, Eicho earthquake

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HDS25-03 Room:101A Time:May 28 09:30-09:45

Lithology and age of sediments accumulated in linear depressions on the Nagakabe Ridge in Kamikochi, Japanese Alps

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There are many double ridged on the Nagakabe Ridge extending from Tokusaka to Chogatake Mountain, northeast of Kamikochi, southern Japanese Alps; most of them are interpreted as the deep-seated gravitational slope deformation features. In order to reveal the development history of these geomorphic features, the sediments accumulated in the linear depressions between the ridges were drilled by the hand auger boring, and the lithology were described and the ages were estimated. The drill sites are located along the climbing trail about 2000 m (Point A) and 2050 m (Point B) above sea level, and are surrounded by conifer trees. The sited are on the flat surfaces between the multiple ridges, and nine cores 80-160 cm long were obtained. The sediments are composed of the upper part of carbonaceous mud and the lower part of yellowish-brown silt (pebbly in part), between which is the gray mud-silt; the thickness of these sediments are variable from site to site. The fraction of 62-200 micro meters of the sediments are composed of volcanic glass and crystal, clastic material, and plant fragment. The volcanic glasses are the mixture of bubble wall-type and pumice-type glasses. The core GUNK-7 from Point A, ca 160 cm long, starts to include bubble wall-type glasses from the depth of 87-92 cm, and for the core GUNK-2 from Point B, ca 150 cm long, the depth is 62-72 cm. The values of refractive index of these volcanic glasses are scattered around 1.510, and are coincide with those of Kikai Akahoya tephra about 7300 cal BP. We will also report the AMS 14C ages of plants included in the sediments.

Keywords: deep seated gravitational slope deformation, double ridge, Nagakabe ridge, Kamikochi

Japan Geoscience Union Meeting 2015
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HDS25-04 Room:101A Time:May 28 09:45-10:00

Preliminary study on formative factor of uphill facing scarplets based on bell-shape index of high relief mountains

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Double ridges or up-hill facing scarplets distributed on mountain ridge in high relief are known as indicators that mountain bodies are undergoing gravitational creep deformation and as signs of landslide in large scale.

Mountain ridges in northern part of Hida Range (Northern Japan Alps) show gentle and round and are fringed by distinct break of slopes. Mountain profiles of high contrast between steep lower slope and gentle ridge ridge tops are similar to a bell-shaped mountains of high relief. In another word, the bell-shaped profile is one kind of the convexity in ridge profiles. The authors think this index is a good marker of gravitational rock creep and a subsequent deformation of mountains. However, there sometimes develop up-hill facing scarplets on low convexity slope in that area. This study tries to consider contribution of strike slip faults as to the formation of up-hill facing scarps on such slopes.

Keywords: gravitational deformation, bell-shape index, high relief mountain, strike slip active fault

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HDS25-05 Room:101A Time:May 28 10:00-10:15

Long-traveling landslide on snow: a case of Daimyojin-sawa, upper course of Katakaigawa River, Toyama Prefecture, Japan

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Long-travelling landslide on the snow occurred in the spring of 2014 was described. The source area of the landslide is located at near the head of Daimyojin-sawa, upper course of Katakaigawa River. Precise date of occurrence is unknown because the locality is in the deep mountainous area, so that the trigger is also uncertain. However, it may not be by earthquake, but by rainfall with snow melting.

Interpreted by airphoto, the dimensions of the source area are approximate 65 m in width and 160 m in length. The inferred volume of the landslide reaches 100,000 m^3. Geology of the bedrock is Jurassic Funatsu Granites.

The landside debris flowed down along the Daimyojin-sawa with 35 degrees incline and were deposited on the snow with 0.2-0.5 m thick. The travelling distance is 2.4 km, and relative height is 980 m, namely, the equivalent friction coefficient (H/L) becomes 0.41.

The landslides slid on the snow are composed of various materials such as mixture of water, snow and rock fragment. The mobility of the landslides depends on the materials as well as topography.

Keywords: landslide, long-travelling, snow, Toyama

Japan Geoscience Union Meeting 2015
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HDS25-06 Room:101A Time:May 28 10:15-10:30

Detection of landslide triggered by 2014 North Nagano Prefecture earthquake using ALOS-2/PALSAR-2 InSAR image

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InSAR image was produced from HH-polarized ALOS-2/PALSAR-2 data measured on 2 Oct 2014 and 27 Nov 2014, then superimposed by landslide distribution map (National Institute for Earth Science and Disaster, 2000). As a result, it was difficult to identify the surface deformation of Happo-iwa landslide and Kakurezawa landslide (Komatsubara et al., 2015) triggered by 2014 North Nagano Prefecture earthquake; however, the image inferred the subtle amount of deformation on no-landslide slope near Shimizu-yama.

Acknowledgement
Software RINC 0.27 developed by Dr.Ozawa, National Institute for Earth Science and Disaster was used in producing InSAR image.

References

Komatsubara et al., 2015, Landslide in Nakaya district, Otari Village and lateral spread in Horinouchi district, Hakuba Village triggered by North Nagano Prefecture earthquake (M=6.7) on 22 Nov 2014, Journal of the Japan Landslide Society (in press).
National Institute for Earth Science and Disaster Prevention, 2000, landslide distribution map database.
Ozawa T, 2014, Development of InSAR analysis tool in National Institute for Earth Science and Disaster Prevention (series 3), JPGU2014, STT59-P12.

Keywords: earthquake, landslide, SAR, ALOS-2, PALSAR-2

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HDS25-07 Room:101A Time:May 28 10:30-10:45

Landslide occurrences and recurrence intervals of heavy rainfalls in Japan

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Rainfall-induced landslides frequently occur in the Japanese archipelago. Radar-Raingauge Analyzed Precipitation has been operated by Japan Meteorological Agency since 1988. These rainfall data is useful for understanding the relation between landslide occurrences and the rainfall conditions. This study developed the probable rainfall database across Japan and analyzed the potential correlation between the landslide magnitude-frequency and the recurrence interval of the heavy rainfall. We analyzed 4,744 rainfall-induced landslides (Saito et al., 2014, Geology), and the rainfall intensity (mm/h), cumulative rainfall (mm), and soil water index (SWI). We then estimated recurrence intervals for these parameters using a Gumbel distribution with jackknife fitting. Results show that the recurrence intervals of SWI which caused landslides ($<10^3$ m^3) are less than 10 yr across Japan. The recurrence intervals increased with increases in landslide volumes. With regard to the landslides larger than 10^6 m^3, recurrence intervals of the rainfall events are more than 100 yr. These results suggest that recurrence intervals of heavy rainfalls are important for assessing regional landslide hazard in Japan.

Saito, H., Korup, O., Uchida, T., Hayashi, S., and Oguchi, T., 2014. Rainfall conditions, typhoon frequency, and contemporary landslide erosion in Japan. Geology 42, 999-1002.

Keywords: landslides, magnitude-frequency, recurrence intervals of heavy rainfalls, Radar-Raingauge Analyzed Precipitation

Japan Geoscience Union Meeting 2015
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HDS25-08 Room:101A Time:May 28 11:00-11:15

Prolonged Changes in Sediment Discharge after Large Sediment Yield Events

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Much large-scale landslide disaster has happened in Japan up to now.

They are caused by a natural phenomenon of an earthquake and a torrential rain.

It is important to consider the period of several years after large-scale sediment production by collapse such as deep-seated landslide, in terms of management of basin-sediment discharge and making arrangements to deal with the emergency for large-scale sediment disaster.

There are studies for grasping actual condition of sediment discharge after large-scale sediment production in these days.

However, it is not clear that how sediment discharge after large-scale sediment production changes with age, and that what has an effect on the sediment discharge.

In this study, we researched about nine different basins where large-scale sediment disaster such as deep-seated landslide occurred, organized information about actual condition of sediment discharge after large-scale sediment production, and analyzed that what effects on sediment discharge.

In this study, we adopted two estimation method of the sediment production described to below.

(1) We estimated landslide area by interpretation of aerial photograph taken before and after large-scale sediment disaster, and applied Guzzetti formula for each landslide area. In doing so, we could estimate sediment discharge volume from landslide area.

(2) We regarded the average of the difference of aerial laser profiler at two shooting date and time as the landslide depth, and estimated sediment discharge volume by multiplying landslide area by one.

We estimated sediment yield by setting up the value that we added microscope sand such as wash load to sediment storage in dam.

We could estimate sediment discharge volume from landslide area

We estimated sediment discharge volume with age, and analyzed a change of sediment yield after large-scale sediment production. Thorough the analysis of change of sediment production and sediment yield with age in different basins, we could compared and analyzed the effects (such as an earthquake, a torrential rain and the amount of precipitation) on sediment discharge after large-scale sediment production.

Keywords: sediment discharge, landslide, landslide dam

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HDS25-09 Room:101A Time:May 28 11:15-11:30

Relations of urbanization and the suffering of the alluvion drill,on large debris disaster of Hiroshima

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By the large-scale debris flow disaster in Hiroshima-City that occurred on the early morning of August 20, 2014, a lot of debris flows occurred for all-at-onceness from the steep mountainous district near plains and overflowed in the residential area of slope of diminishing gradient which was formed to border the foot of a mountain that faced it mainly along the valley of the lower Otagawa region and brought big damage.Hiroshima region has little level ground, and a mountainous district with Chugoku district special constant height spreads out. Steep terrain of relative height 300m - 700m approaches the level ground, and slope of diminishing gradient of 3 degrees - 20 degrees is formed at the exit of many valleys flowing down from the mountainous district a slant. In the Hiroshima suburbs lacking in the level ground, this slope of diminishing gradient is developed flourishingly as a residential land.However, according to the exact topography model that it made by a model laser profiler mounted with a plane after a disaster, as for most of slope of diminishing gradient, it became clear to be the alluvion drill which the development of the bench was formed from the extremely fresh sedimentation side that it had little. As for this,slope of diminishing gradient is the place where accumulating continues now; of the mud flood flow down; and suggest that sedimentation occurs frequently. In fact, of the mud flood by this disaster that Japan Society of Erosion Control Engineering made flowed down, and a slant overlapped with the range of 3 degrees - 20 degrees, and, in the sedimentation range, a lot of of the place that occurred of the victim was almost slope of diminishing gradient more than slant 7 degrees that the valley exit was near again. In addition, a mean incline between the style inferior segment of the mud flood matches that a mud flood sedimentation section is said more than 3 degrees more than 10 degrees.In Hiroshima District, I suffer big damage in a residential area developed by the large-scale earth and sand disasters that occurred on June 29, 1999 in the similar topography ground in the past. Therefore, using base map information numerical value topography model, a slant around Hiroshima-City extracted the domain of less than 20 degrees more than 3 degrees. As a result, in slope of diminishing gradient formed by the alluvion drill top and creation over a wide area in the city, a slant was able to extract domains more than under 15 degrees, 15 degrees more than less than 10 degrees, 10 degrees more than 3 degrees. After repeating a population concentration area in these domains, it was wide, and, on a slope having a slant equivalent to a mud flood sedimentation section between the mud flood style inferior segment in the Hiroshima-City suburbs, it was confirmed some other time that development advanced.

Keywords: debris flow, alluvial cone, urbanization, disaster risk