

Prompt Report on Landslides Triggered by the 2018 Hokkaido Eastern Iburi Earthquake on September 6, 2018

Prompt Disaster Survey Team on landslide disasters triggered by the 2018 Hokkaido Eastern Iburi Earthquake

1. INTRODUCTION

On 6 September 2018, a large earthquake (called “the 2018 Hokkaido Eastern Iburi Earthquake”) struck the eastern Iburi region, Hokkaido Prefecture, Northern Japan and triggered numerous landslides. The Japan Society of Erosion Control Engineering set up a disaster survey team, and carried out prompt survey immediately after the earthquake. Here the team reports the results of the prompt survey.

2. EARTHQUAKE OVERVIEW

<Date and Time>

03:07 on September 6, 2018

<Seismic center>

42.7° N, 142° E; 37 km depth (Provisional)

<Magnitude>

6.7 (on the Japan Meteorological Agency (JMA) scale) (Provisional)

<Maximum Seismic Intensity>

7 on the JMA seismic intensity scale (0 - 7) in Atsuma

<Earthquake Mechanism>

Reverse dip-slip fault with a pressure axis in the ENE-WSW direction

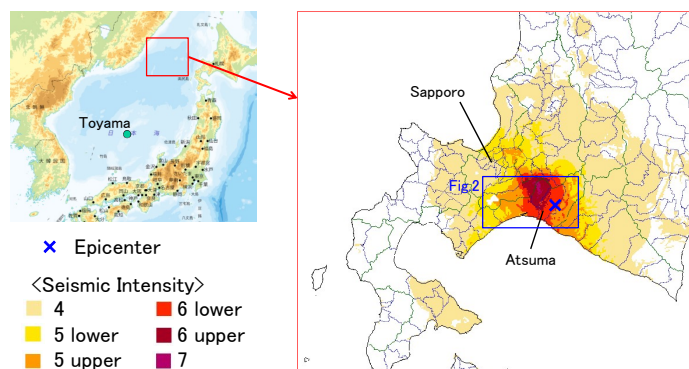


Fig. 1 Epicenter and estimated seismic intensity (provided by the Japan Meteorological Agency (JMA))

3. DAMAGE

3.1 Overall Damage

<Human damage>

41 dead, 689 injured

<Building (house) damage>

156 completely destroyed, 4,502 partially destroyed

3.2 Damage caused by landslides

<Human damage>

36 dead

<Building (house) damage>

(Currently under investigation)

4. GEOLOGY OF AREAS MOST AFFECTED BY THE EARTHQUAKE

- Underlain mainly by the Neogene mudstone, sandstone and conglomerate
- Covered by thick pyroclastic fall deposits derived from Tarumae Volcano etc.

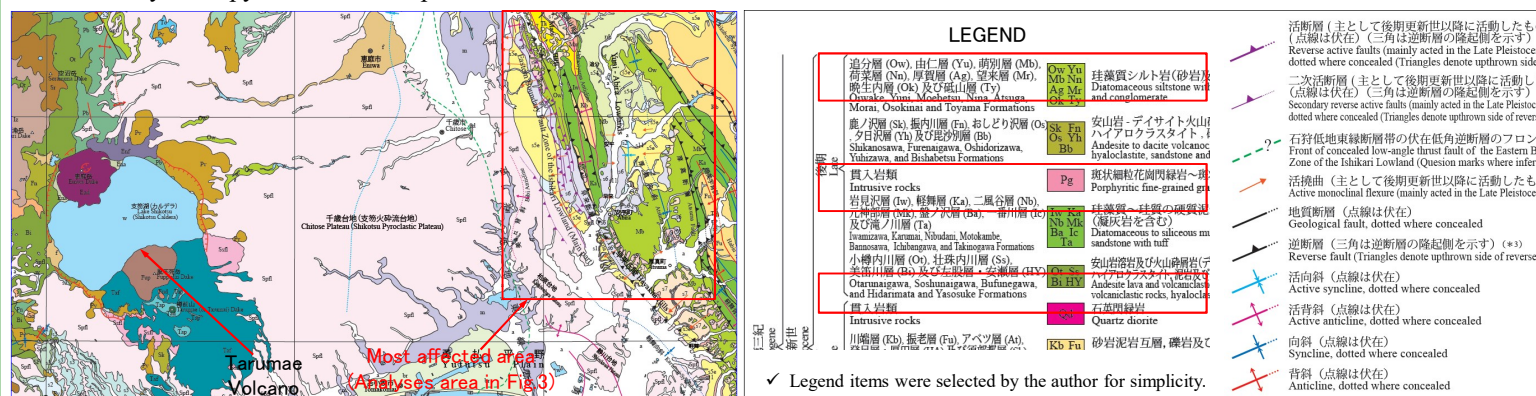


Fig. 2 Geological map (provided by the National Institute of Advanced Industrial Science and Technology)

5. GENERAL REMARKS ON LANDSLIDES

- Landslides intensively occurred in Northern Atsuma, struck by the strong shock of the inland earthquake (estimated seismic intensity of greater than 6 lower).
- Numerous shallow landslides (depth: 2-4 m) occurred at slopes. The shallow landslides generally initiated from around the top of the slope.
- Some shallow landslides occurred in a relatively gentle slope (around 15 degree).
- Slided materials consisted of less solidified pyroclastic fall deposits (derived from Tarumae Volcano etc.) containing almost no boulders, and were not disturbed and deposited remaining the original layers.
- Landslides moving along a valley topography involved trees and travelled longer than those moving along a non-valley topography.
- Typhoon Jebi hit the area immediately before the earthquake (September 4-5), but the recorded amount of rainfall is only 13 mm at Atsuma. Springs were rarely observed in the landslide scars. It seems that the effect of Typhoon and accompanying rainfall was not significant.
- A large amount of sediments which seem prone to move still remains in the fringe of the landslide scars. Aftershocks and relatively small amount of rainfall can trigger movement of these sediments. Early warning and evacuation is very important for such areas.

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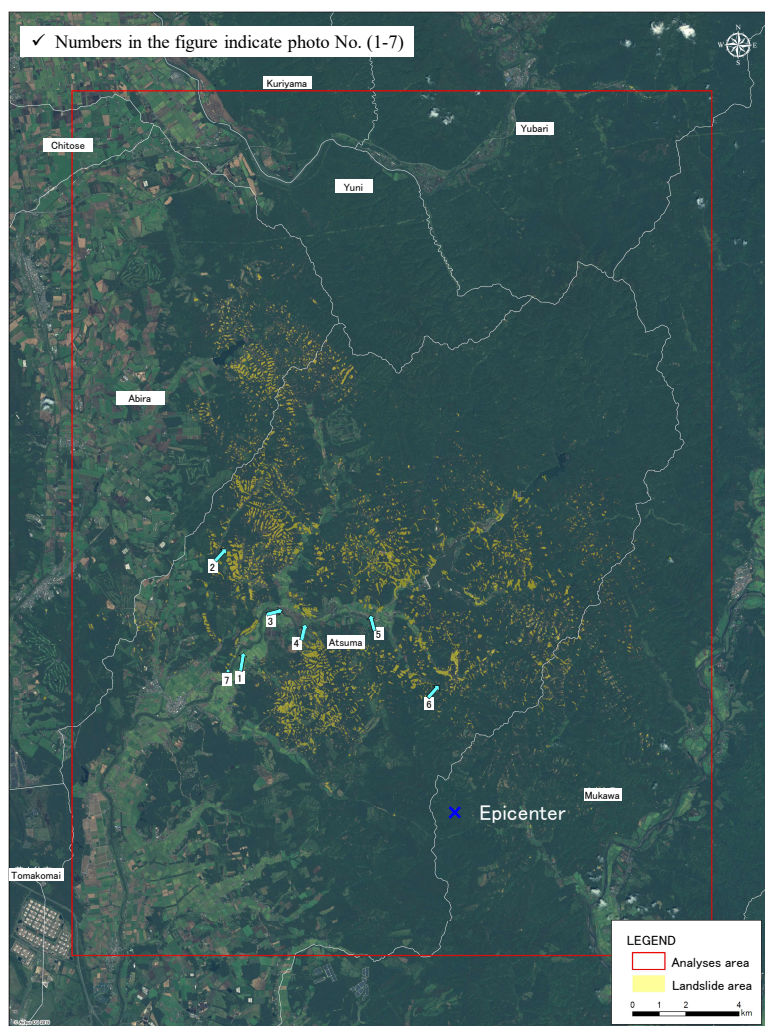


Fig. 3 Distribution of landslide areas based on a SPOT satellite image (taken on September 11, 2018) analyses (provided by Pasco Corporation)



Photo 1 Yoshino area



Photo 2 Upstream areas of Chikaeppu and Yachise River



Photo 3 Tomisato area



Photo 4 Tomisato area



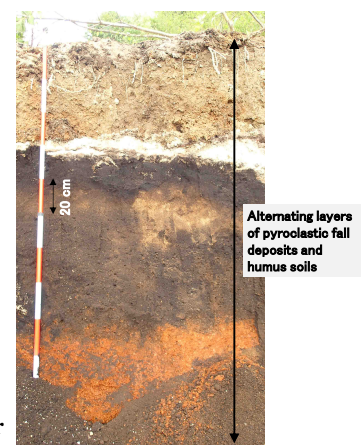
Photo 5 Horonai area



Photo 6 Upstream area of Hidaka-Horonai River



Photo 7
Landslide at Sakuraoka area and outcrop observed at the side of the landslide scar



✓ Photos 1-6 are taken by Asia Air Survey Co., Ltd. and Aero Asahi Corporation.