

A slope failure at Shiretoko-Rausu, Hokkaido, in August 2016

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Many typhoons came near Hokkaido in August 2016. These gave damages in Eastern Hokkaido. The precipitation reached 554mm between 9days, 15th to 23rd August, at Shiretoko-Rausu, Eastern Hokkaido, where annual precipitation is ca.1600mm. The largest slope failure at the time occurred at Kaigan-cho, in Rausu, at 4 pm on 24th, 29 hours after the rain stopped. The failure occurred repeatedly between about 30 minutes from the gentle piedmont on a terrace. The source of this slope failures is 60m length, 40m width and 8-10m depth. The amount of collapsed sediment was estimated to be 19,000m³. The collapsed debris is high liquidity, and reached the coast more than 100m away (equivalent friction coefficient: $H/L=0.3$).

The primary source of the collapse consists of poor sorted sediments, silt with angular, on alternation of gravel and mud with low permeability. This is periglacial sediment, which is common slope deposit in Hokkaido, northernmost Japan. This sediment holds much water after heavy rain as a result of loose and high permeability. A vertical hole, 3m in diameter, appeared in the deposits. Groundwater streams concentrate on the base of the sediment. Because piping holes were eroded by the streams, the vertical hole was formed by the collapse of one of the piping holes.

Andesite is distributed behind the collapsing slope deposits, and the andesite is lower permeability than the slope deposits. This causes that the groundwater level of the andesite rises appeared to be delayed. It is likely that the slope failure occurred with a delay due to the supply of the groundwater from the andesite behind. Because the front of the slope sediment has disappeared by the slope failure, groundwater flowed and formed piping falls due to water level difference.

Keywords: slope deposits, periglacial deposits, piping hole, groundwater level, slope failure, heavy rain