



## **Examining landslide-induced tsunamis by using a low-cost high definition sonar and a simple one-dimensional simulation: A case study in Lake Kussharo, Hokkaido Japan**

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Subaqueous landslides induce tsunami even in small and shallow water areas like rivers and lakes. They are one of hazard risk for shore areas by large earthquakes. However, it is difficult to examine subaqueous landslides due to invisible as they are and high-cost for marine investigation. In particular, small and shallow area is inaccessible for normal survey vessels. We developed a survey method combining a low-cost high definition sonar and a simple one-dimensional computing simulation. In this presentation, we show a case study in Lake Kussharo, Hokkaido, Japan. A tsunami as high as 1 m was occurred with M 6.1 earthquake in 1938. Recent seismic investigation reveals the characteristic geologic structures that indicate deformations of the lake floor, but there has been no bathymetric maps enough to analyze topography relates to the geologic structures and no spacial data of bottom material on the lake floor. We obtained images showing bottom materials by using a recent low-cost high definition sonar, and made bathymetric maps with 20 m-interval measuring lines covering two deformed areas. These results showed ~800 m-long relatively fresh landslide topography. We also obtained a topographic profile cutting across the landslide and the lake, and carried out the tsunami computing simulation. Setting 100 sec for the duration of landslide (5 m/sec in velocity), the tsunami height in the record was reproduced.