

Activities for Wide-Area Development of Technologies for Large-scale Sediment-related Disaster Countermeasures

Sabo Department

In the 2011 Kii Peninsula Flood Disaster, large-scale sediment collapse and movement including deep-seated landslide, shallow landslide, and debris flow occurred and caused serious damage. Sabo Department has been studying the mechanism and countermeasures for sediment disasters in cooperation with the Technical Center for Large-scale Sediment-related Disaster Countermeasures (Nachi-Katsuura-cho, Higashi-Muro-gun, Wakayama-ken).

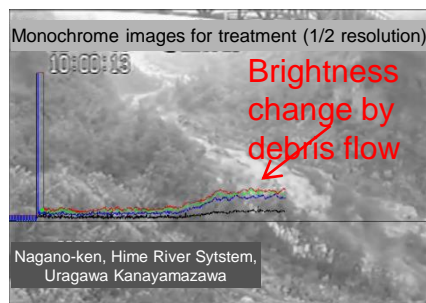
Social background and issues

- In 2011, deep-seated landslide frequently occurred in the basin of the Kumano River, Hiki River, etc. In addition, serious damage was caused by shallow landslide and debris flow to the basin of the Nachi River.
- When large-scale phenomenon of sediment collapse / movement occurs, it is necessary to detect it immediately and take emergency actions including evacuation.

Study contents

Technology for detecting large-scale sediment movement using the image analysis technology

A lot of monitoring cameras are installed, including the mountain area, by river administration offices under direct control. In order to keep on monitoring certainly for 24 hours a day without omission, automatic detection technology is essential. Improvement is also required for the technology of night-time monitoring, in which watching with eyes is difficult. Therefore, we will develop a technology to detect sediment movement automatically from the video and another technology to obtain clear images even during night time. With these technologies, we will strengthen the monitoring system and support labor saving.



Temporal change in brightness calculated from the video of Kanayamazawa

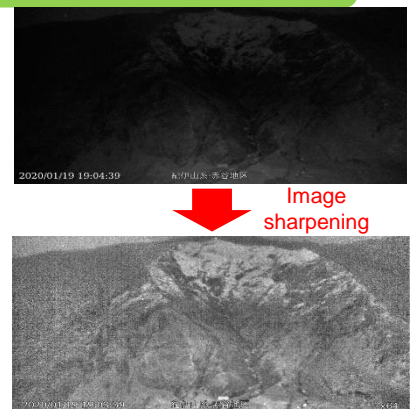
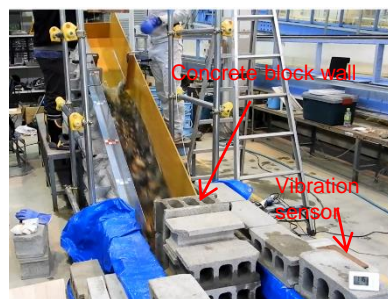


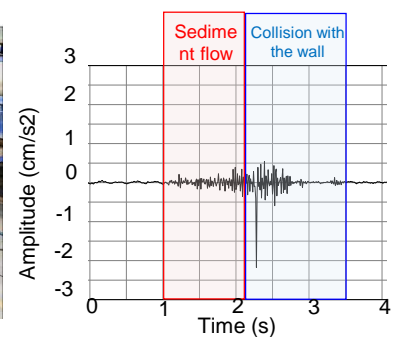
Image sharpening test on the collapsed slope in Akatani Area

Sediment movement detection technology focused on ground vibration in the event of large-scale sediment movement

In the event of large-scale sediment movement, such as deep-seated landslide, the vibration is transferred to the ground at the time of flow or collision. Measurement of this vibration with a seismograph will enable prompt estimation of the occurrence of deep-seated landslide, location of collapse, and the volume of collapsed sediment. In the detection of vibration caused by sediment movement, focus is placed on the difference of frequency and noise from the earthquake and peripheral environment is removed with a filter. By improving this, enhance the accuracy of the sediment movement detection technology.



Vibration measurement experiment of collapsed sediment



Ground vibration generated by collision of sediment

Realize a society where prompt evacuation and guidance for residents and grasp of the site situation by administration are possible even in the event of a large-scale sediment disaster.

- ☞ Related articles are here. (introducing related articles of the divisions in charge)
- 2012 White paper on Land, Infrastructure and Transport in Japan, Part II, Chapter 6 (p. 212) Column "Large-scale Collapse Watching and Warning System"
- Technical Center for Large-scale Sediment-related Disaster Countermeasures
<https://www.kkr.mlit.go.jp/kiisankei/center/index.html>