

Development of monitoring system for rain-induced landslides

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In order to mitigate the rain-induced landslide disasters, monitoring and forecasting of the landslides are important. So far, the indoor and outdoor experiments on landslides have been carried out based on hydrological and geotechnical measurements.

In this study, self-potential approach is applied to develop an early warning system for rain-induced landslides. At the first step, laboratory experiments under the precipitation control were conducted. The results show the capability to monitor the sub-surface water condition using self-potential method. This paper focuses on transient signals of self-potential change a few tens minutes before the main slide. The signals can be seen only in self-potential changes. Their changes are remarkable step-like and rectangular and observed only below the upper boundary of the slipped body. The detected electric field is almost uniform.

For these reasons, we have an assumption that the transient signals of self-potential change were affected by the soil displacement or fluid flow under the ground. Then, this paper shows soil displacement which seen in the images shot on digital video cameras in the indoor landslide experiments. It is found that the transient signals occurred around or after the increasing of the soil displacement. This paper reports the relationship between the transient signals and the soil displacement. Because of low resolution of image, the clear relationship between the transient signals and the soil displacement couldn't be seen. But using strain displacement, it turns out that compression and expansion partly occurred in the soil, and then most pf the soil become compressive. The details will be presented at the conference.