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Survey of Stream Water Chemistry in a Region at Risk of Deep-Seated Landslides in Taiwan

Tomohiro Egusa[*1], Norifumi Hotta[2], Yosuke Yamakawa[2], Tomoki Oda[1], Yuan-Jung Tsai[3], Shin-Ping Lee[3]*
1. Agricultulal and Life Sciences, The University of Tokyo
2. Life and Environmental Sciences, University of Tsukuba
Japan
3. Disaster Prevention Reseaech Center, National Cheng Kung University
Taiwan

ABSTRACT

Predicting deep-seated landslides is important because they not only cause enormous damage at the time of occurrence, but also have long-term impacts on the downstream area by supplying of large amounts of unstable sediment (Gostelow, 1996). Recently, it has become possible to predict sites with the highest risk of deep-seated landslides using detailed terrain data. In Taiwan, more than 400 at-risk sites were defined using detailed terrain data collected in 2005. These were concentrated in a small region in north-central, south-central, and south-eastern Taiwan. Most of the 42 places where deep-seated landslides have occurred since 2005 were in this extracted sites. This effort to narrowly define the area at risk of deep-seated landslides has been successful.

Water quality data of streams have the potential to solve this problem. Jitouzono et al. (2006) reported that the electrical conductivity (EC) of stream water in areas at risk of deep-seated landslides was higher than in nearby streams. They suggested that a flow path through deep bedrock developed with the growth of the slip surface. If this result can be generalized, it may facilitate the prediction of which sites within the high-risk region present the most immediate threat of a deep-seated landslide.

This presentation is a preliminary stage of the project, wherein we aim to clarify whether there was a specific water quality trend in this area using a water quality survey.

The finding that springs had higher SiO2 values than stream water suggests that EC and SiO2 represented the flow path in this area. The lack of a clear influence from the density of high-risk sites on the EC–SiO2 relationship suggests that natural variability in the flow path is greater than the variability due to the density of landslide risk areas. It does not deny the possibility of extracting more high-risk areas using water quality data. However, it suggests we need to be careful to conduct the extraction.

KEY WORDS: Deep-seated landslide, water chemistry, stream water