

# Study on Correlation of Water Quality and Large-scale Landslide in Taiwan

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## INTRODUCTION

How to predict the occurrence of the large-scale landslide become a big issue in Taiwan after Hsiaolin Village disaster in 2009. The rainfall, infiltration and groundwater play important roles in the occurrence mechanism of the large-scale landslide. To clarify the volume or ratio of groundwater is the first to setup the conceptual model.

## METHOD

In this study, select the water sample points by large scale potential landslide provided by Central Geological Survey, Taiwan, totally collecting 415 water samples, including Tsengwen watershed taken 101 samples, Kaoping watershed taken 210 samples, Linbian watershed taken 52 samples and coastal areas in Taitung taken 52 samples.

The concentration of inorganic ions are detected by ion chromatography and using electricity conductivity meter to detect the electricity conductivity in water samples. Also using piper diagram to remove the water samples affected by human activities and saltation by sea water, in the water samples, there are 6 bottles in two zones.

## RESULT AND DISCUSSION

From time difference, as **Figure 1** shows, the electricity conductivity of dry season is larger than wet season, the electricity conductivity value is about  $300\mu\text{S}/\text{m}$ , because the electricity conductivity is affected by rainfall. From spatial difference, in four study zones, the Kaoping watershed has highest value and coastal area in Taitung has lowest value.

In Kaoping watershed, the difference electricity conductivity value is about  $200\mu\text{S}/\text{m}$  between Meilong River and Zhuko River. From the relationship between landslide rate and electricity conductivity, the potential landslide rate is calculated by sub-watershed area divides into large scale potential landslide area, using the measurement points at downstream of the sub-watershed to represent the sub-watershed. .

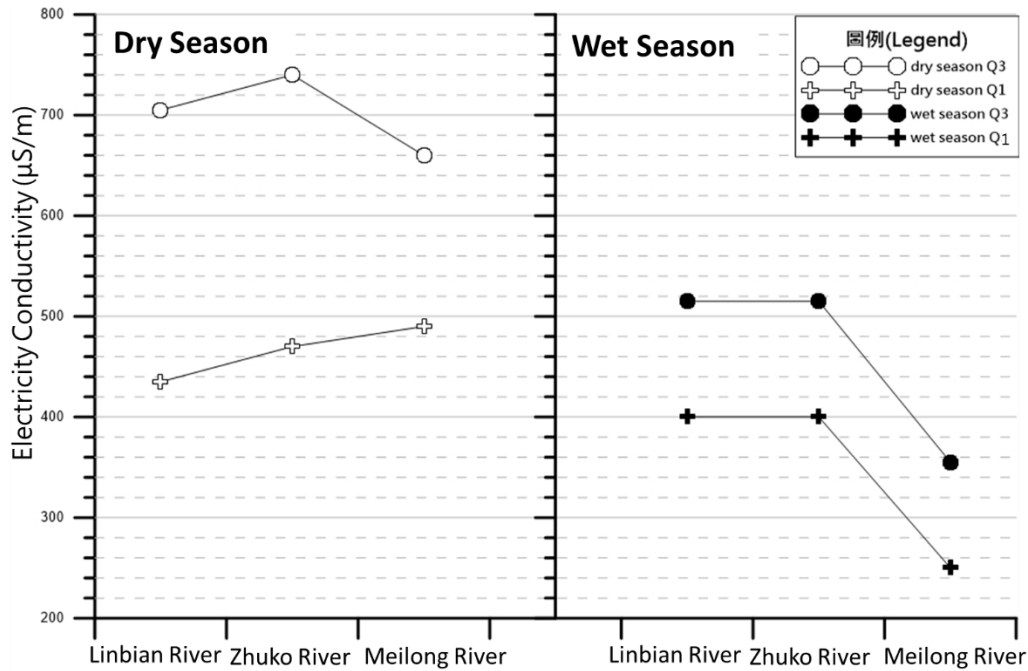
**Figure 2** presents the correlation of electricity conductivity and potential landslide rate. It can show linear relation, which  $R^2=0.69$ . If the landslide rate is high, the electricity conductivity will be high.

## CONCLUSIONS

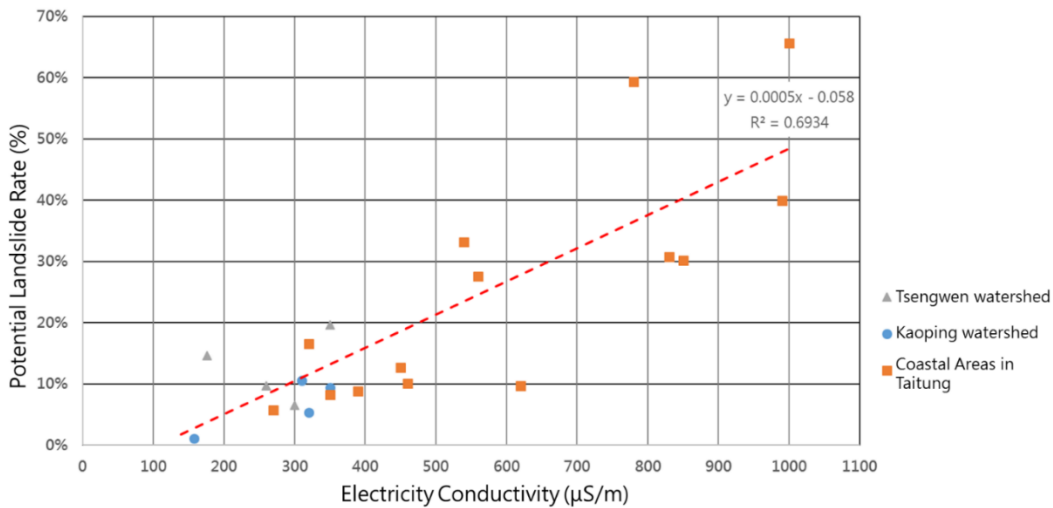
From analysis of electricity conductivity of stream, the electricity conductivity of stream is affected by inrush water from the potential landslide. When the measurement points close to the inrush water,

the electricity conductivity will raise, on the contrary, when the measurement points away from the inrush water, the electricity conductivity will decrease.

Above all, it can handle the relationship between landslide and electricity conductivity, and hope to establish the warning system of the large-scale landslide, to fight for more time to response the large scale landslide.



**Figure 1** The correlation of electricity conductivity and time difference



**Figure 2** The correlation of electricity conductivity and potential landslide rate

**Keywords:** large scale landslide, water quality