

# Influence of Rainfall on Landslide Susceptibility along 50 to 110k Section of the Southern Cross Island Highway, Taiwan

Hsun-Chuan Chan<sup>1</sup>, Jih-Syong Peng<sup>1</sup>, Chia-Chi Chang<sup>1,\*</sup>

<sup>1</sup> Department of Soil and Water Conservation, National Chung Hsing University, Taiwan

\*Corresponding author. E-mail:d100042004@mail.nchu.edu.tw

## INTRODUCTION

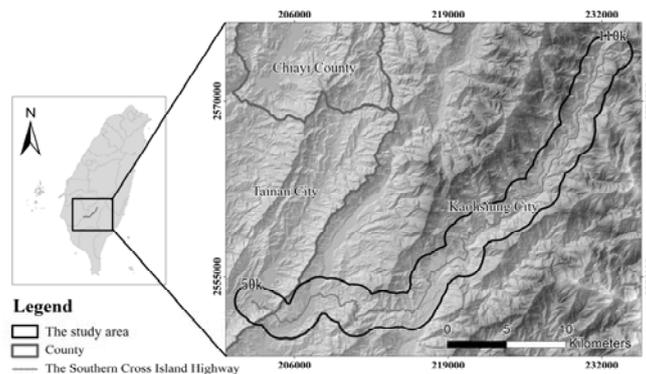
The Southern Cross Island Highway was suffered from the landslide disaster in recent years. In order to reduce the reconstruction cost of broken road, the landslide susceptibility models were established in this study. The mileage ranging from 50 to 110 kilometers and buffer range of 1,400 meters of the Southern Cross Island Highway was selected as the study areas.



**Fig. 1** Landslide in the Southern Cross Island Highway

## RESEARCH METHOD

The inventories of landslide during typhoon Mindulle, Morakot, and 0719 rainfall event by Central Geological Survey were selected as the landslide data. The elevation, slope, slope aspect, slope high, lithology, terrain roughness, slope roughness, plan curvature, profile curvature, total curvature, distance of road, and distance of river were first chosen as the landslide causative factors, according to the previous studies.

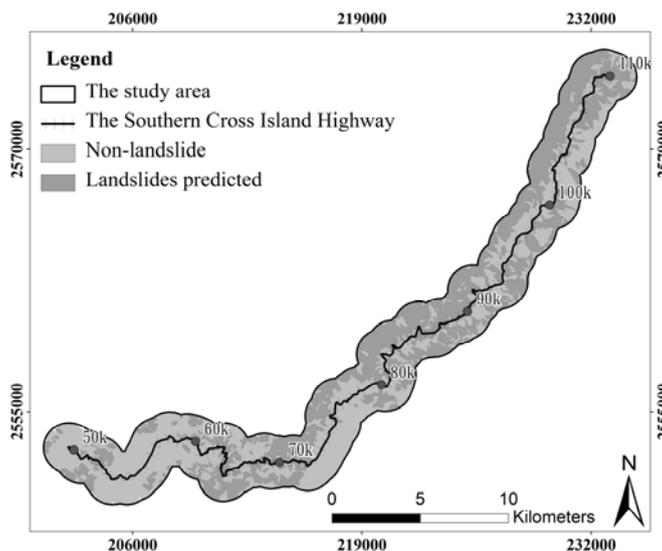


**Fig. 2** The study area

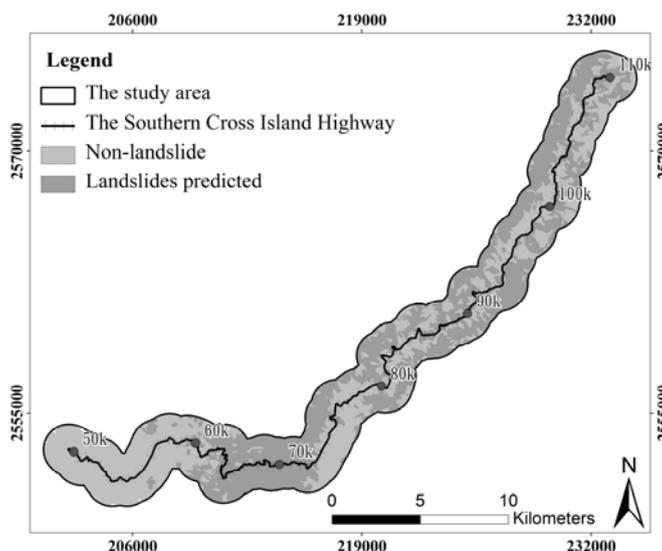
Secondly, the calibration and selection procedure were performed to select the factors efficiently. Logistic regression method was used for establishing the landslide susceptibility model. Furthermore, the rainfall intensities of different rainfall duration were used as a landslide triggering factor in different rainfall events.

## RESULTS AND CONCLUSIONS

As a result, the present model predicted landslide effectively. The overall accuracy of three rainfall events was higher than 70%. However, the results of Mindulle and 0719 rainfall event did not improve obviously by using landslide triggering factors. The overall accuracy of Morakot event increased 66.82% to 71.34% after considering the landslide triggering factor. Namely, the model with the rainfall factor increases the landslide predictive capability, once the rainfall event belonged to the type of long-duration and high-intensity, such as Morakot event. The other two events remain similar landslide predictive capability with and without the landslide causative factor in the model.



**Fig. 3** Compared predicted landslide (without rainfall data) with actual landslide by logistic regression model



**Fig. 4** Compared predicted landslide (join rainfall data) with actual landslide by logistic regression model

**Keywords: Logistic regression, the Southern Cross Island Highway, rainfall intensity**