

## **GIS Application for Landslide Hazard Mapping in Phang Nga Region, Southern Thailand**

**Krittapob Akkrawintawong<sup>1\*</sup>, Wisut Chotikasathien<sup>2</sup>, Veerote Daorerk<sup>1</sup> and Punya Charusiri<sup>1</sup>**

<sup>1</sup> Earthquake and Tectonic Geology Research Unit (EATGRU), Department of Geology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

<sup>2</sup> Environmental Geology Division, Department of Mineral Resources, Bangkok 10400, Thailand

\*Corresponding author e-mail: krittapob@dmr.go.th

### **Extended Abstract**

Earthquake on 26 December 2004 induces many small-scale landslides in southern of Thailand. In particular, people in many villages located within high hill terrains of Phang Nga province has suffered from this disaster (Fig.1A and B). Therefore, the whole Phang Nga province located in Southern peninsular of Thailand (Fig.2) was chosen as study area to obtain more accurate and reliable analytical results. In Phang Nga province, landslides have been recorded since 1987 by Nawavitphaisit (2005). Therefore not much attention has been paid in detail on these landslides (Fig.1A and B).

This study performed landslide susceptibility study using the landslide prediction model. Landslide susceptibility investigation was carried out in Phang Nga based on the work of Pantanahiran (1994). This technique relies on an inventory of past landslides. Remote sensing information i.e., aerial photographic images, satellite images through the digital enhancement technique was used for classification of landslide scars, deforested areas and bare land areas. The GIS applications were applied for evaluating landslide hazard area. In relation to causative factors, input parameters considered for calculation, adjusted aspect, slope, flow accumulation, flow direction, digital number of reflection (LANDSAT TM band 4), brightness and wetness. Geologic parameter has been added up in this landslide prediction model. With regard to rock types all over the country and from many trial and errors studying of past landslide in Thailand, we can categorize type of lithology into 4 classes of landslide probability unit value (Table 1) depending on degree of weathering susceptibility based on the work of Chotikasathien (2003) (Table 1).

From the result of this primary analysis in conjunction with geological field, we can observation can categorize levels of landslide hazards in Phang Nga province and to produce the landslide hazard map of the province (As shown in Fig.3), the degrees of landslide hazard can expressed in relative term from very low to very high hazard levels, and they represent the expectation of future landslide occurrence in Phung Nga area. The landslide hazard map of Phang Nga province shows that the high susceptibility area of landslide is located in the granite mountainous area. Especially, in the area where it is controlled by fault system. The result of our landslide analysis conforms well to those of the field observation (Fig.3). This landslide predictive model and remotely sensed data can also be applied in other areas where geology, geography, and climate are relative similar. It is anticipated that our study can be a good case study for defining landslide hazard level, delineating the mass movement areas and establishing the guideline for urban and rural community management. Our result can be applied as well in areas of southern peninsula where granites are main exposures.

**Table 1. Ranks of rock types susceptible to landslides, expressed in term of probability.**

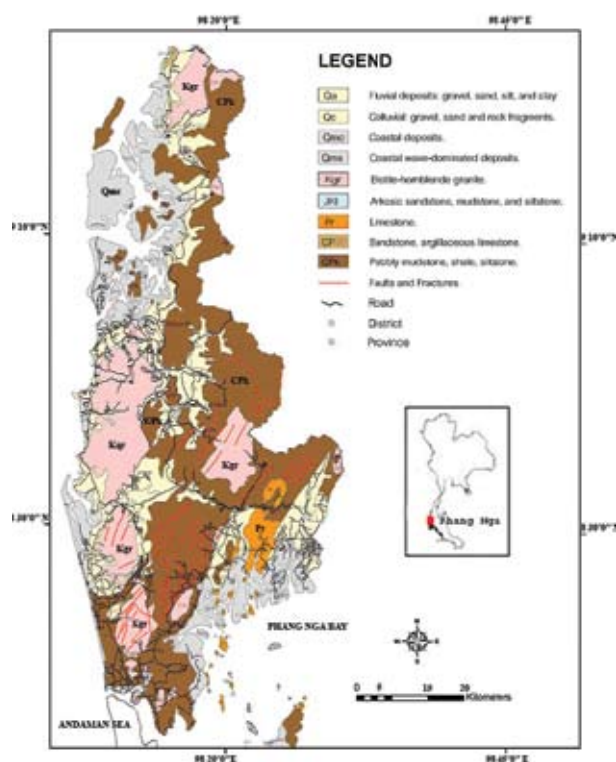
Rock Type	Probability	Not weathered and/or no fracture	Strongly weathered and/or fractured
Carbonate rocks	0-1	0	1
Coarse-clastic and Meta sediments	1-2	1	2
Fine-clastic and Volcanic rocks	2-3	2	3
Granitic rocks	3-4	3	4



**Figure 1A.** Medium-size landslide scar (30 x 40 m) in deeply weathered granite terrain with steep slope at Ban Khon Kian, Takua Pa district. (Location given as point 1 in Fig.3)



**Figure 1B.** A nearly-vertical road-cut exposure (20 x 30 m) of soil-slide scar at Ban Lam Ru, Taimuang district. (Location given as point 2 in Fig.3)



**Figure 2.** Geological map of Phang Nga province. (modified after Department of Mineral Resources, 2004)

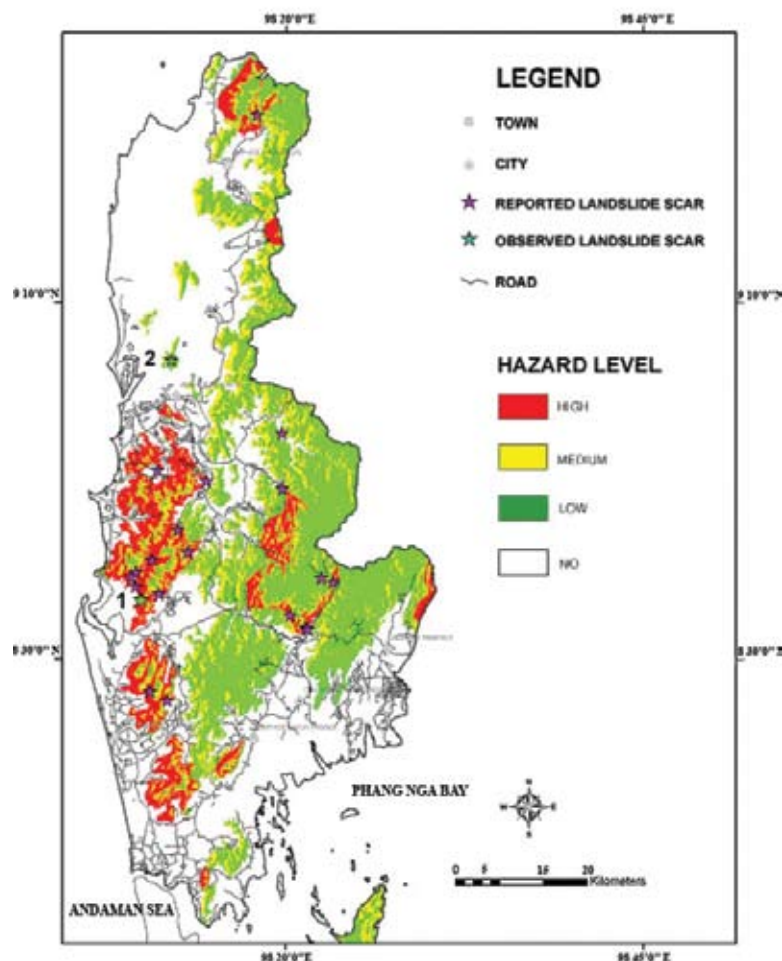


Figure 3. Landslide hazard map of Phang Nga province. Note that the high hazard level is located in the mountainous granite terrain (Fig.2) to the west of study area.

## References

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