

Landslide susceptibility mapping using GIS: A case study of Korea

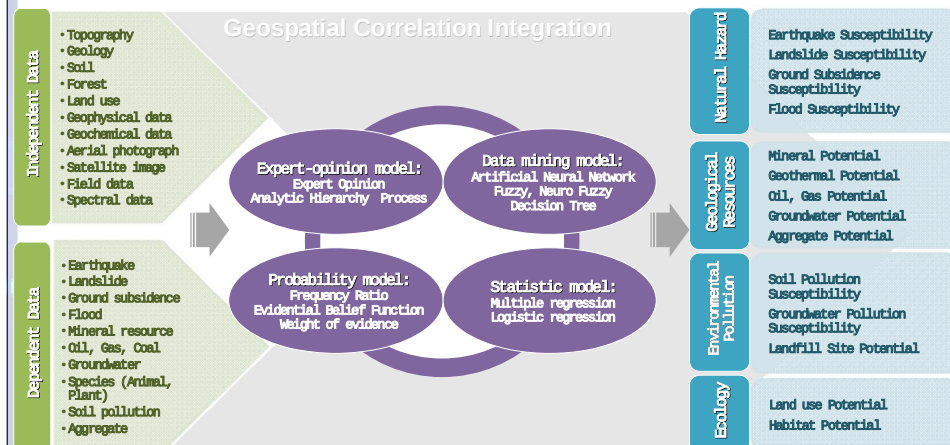
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INTRODUCTION

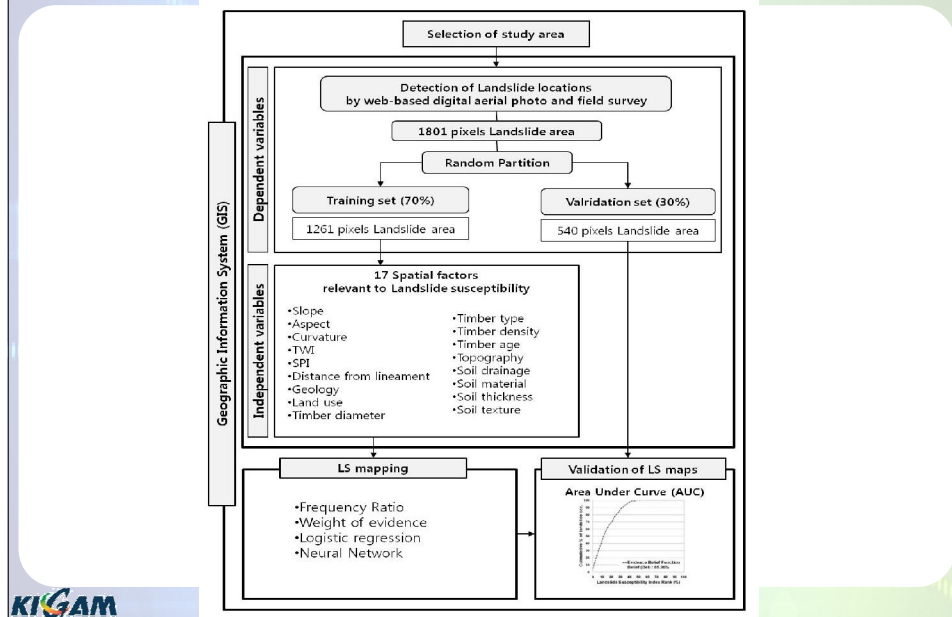
Introduction

- **Landslides** are recognized as one of the **most significant natural hazard** in many areas throughout the world.
- **Predictive modeling** of landslide hazard has emerged as a major research field and has been enhanced by the use of new **technological advancements** (GIS, RS, statistics, etc.).
- The purpose of this study is **to detect landslide location** using web-based aerial photographs, and **to map landslide susceptibility**.
- The landslide susceptibility map was made and validated using frequency ratio, weight of evidence, logistic regression and artificial neural network models with a geographic information system (GIS).

GCI (Geospatial Correlation Integration)



Study flow



Study flow

- The preparation of landslide susceptibility map using GIS involves four major steps in the study.

1) Assembly of a spatial database

A total of 1,801 landslides, topography, geology, soil and forest data were used to create a spatial database using GIS.

2) Processing the data

The known landslides were randomly split 70/30 for training/testing, which used for analyzing and verifying landslide susceptibility maps using likelihood ratio, weight of evidence, logistic regression and ANN models.

Study flow

- The preparation of landslide susceptibility map using GIS involves five major steps in the study.

3) Landslide susceptibility mapping

4) Integration of Landslide susceptibility map

The relationships between landslide and the susceptibility maps (new input factors) from frequency ratio, weight of evidence, logistic regression and artificial neural network models were calculated quantitatively. Then using the relationships, the landslide susceptibility maps were made.

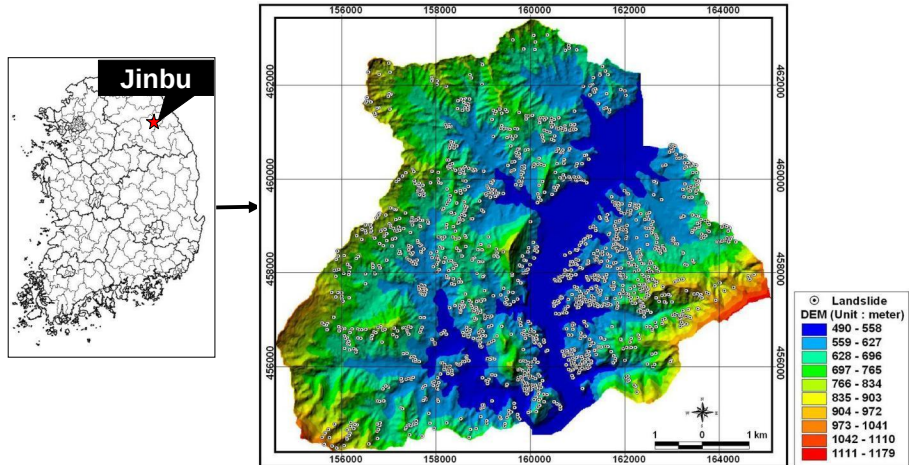
5) verification and comparison of the susceptibility map using test landslides that were not used directly in the analysis.

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DATA

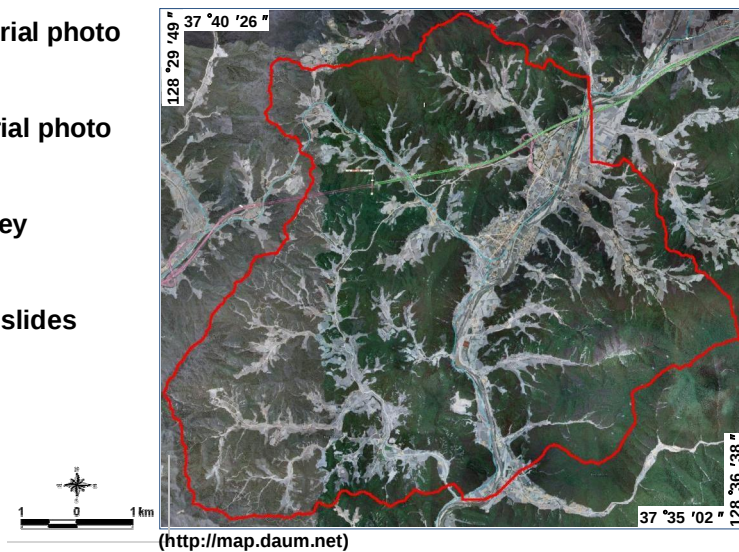
Study area



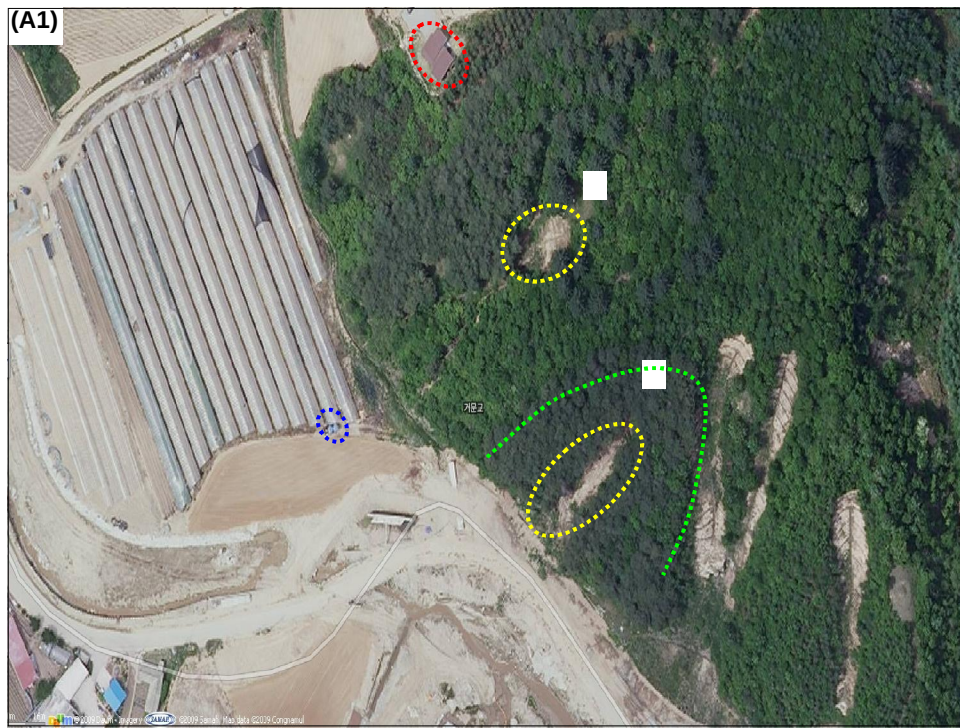
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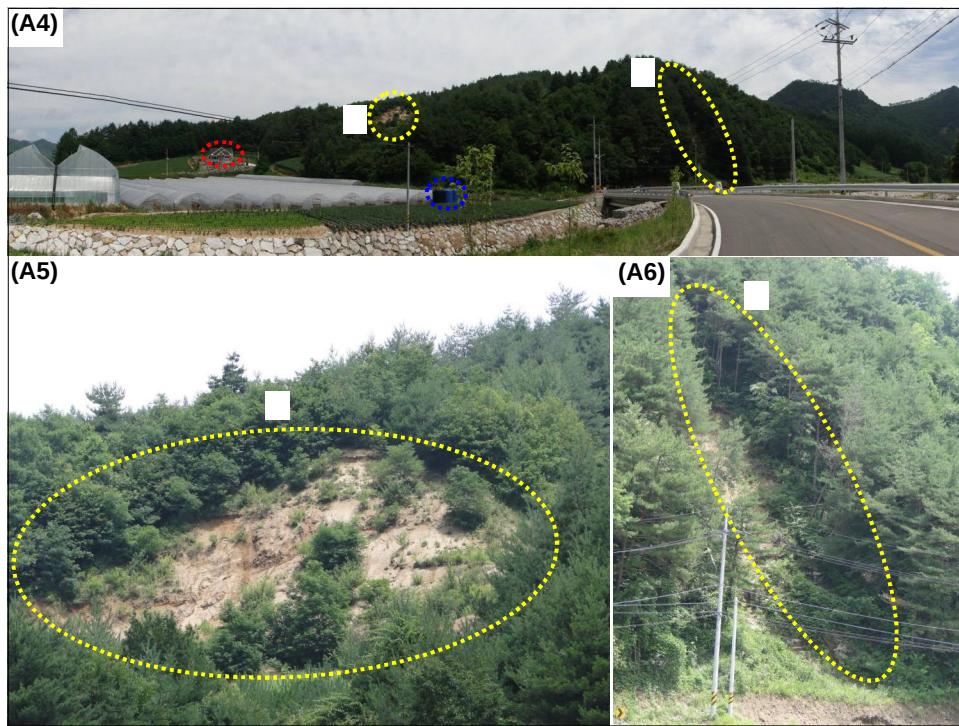
Detection of landslide

- Analog aerial photo
- Digital aerial photo
- Field survey
- 1,801 landslides



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Spatial database

Category	Factors	Data Type	Scale	Remark
Hazard map	Landslide	Point	-	Selection of landslide location based on aerial photo
Topographic map	Slope Aspect Curvature TWI* SPI*	GRID	1:25,000	Calculate from DEM*
Soil map	Soil thickness Soil material Soil texture Soil Drainage	Polygon	1:25,000	Type of soil
Forest map	Type Diameter Age Density	Polygon	1:25,000	-
Land cover map	Land cover	Polygon	1:5,000	Type of land cover
Geological map	Lithology	Polygon	1:50,000	Type of lithology

§ Number of landslide : 1,801

§ Cell size : 10m x 10m

§ Number of total cell : 597,884

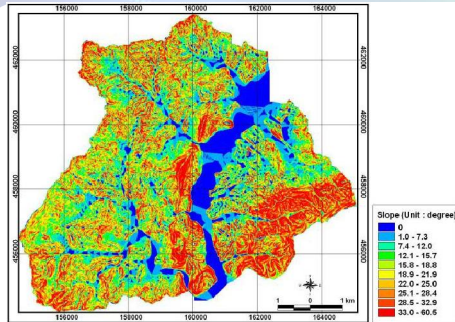
§ Column and rows : 923 x 1,053

TWI * (Topographic Wetness Index)

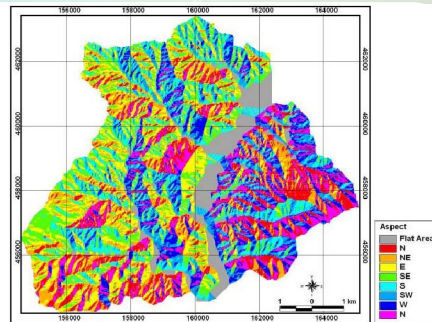
SPI * (Stream Power Index)

DEM * (Digital Elevation Model)

Data layers

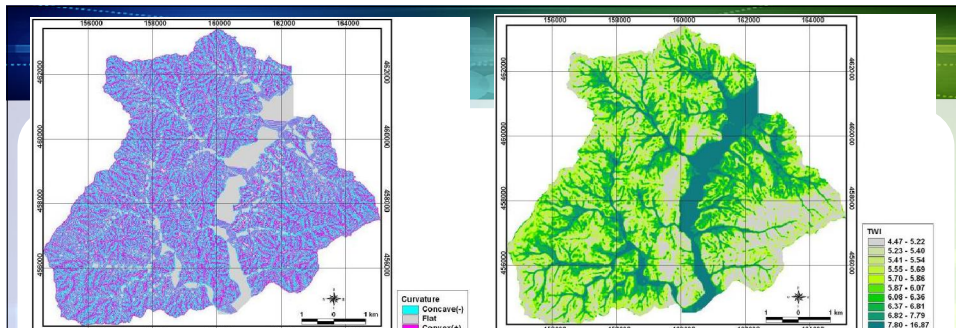


(a) Slope



(b) Aspect

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https://www.yunbaogao.cn/report/index/report?reportId=5_7761

