應用 Logistic 迴歸繪製崩塌潛感圖 - 以濁水溪流域為例

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摘　　要　本文的目的主要係應用 Logistic 迴歸以分析台灣中部濁水溪流域之崩塌潛感。利用 Logistic 迴歸可建立崩塌發生比與獨立變項如坡度、坡向、高程、地質及水系等之間的最佳配適方程式。本研究區域內包含 5355 個大小不等之崩塌地，本研究以此產生反應變數，流域空間上任一網格，當其出現邊坡崩塌破壞時，該網格取值為「1」，否則為「0」。而在 Logistic 迴歸方程式中，各個因子的係數便可視為該因子導致流域空間崩塌破壞之效應。本文除探討 Logistic 迴歸方程式各因子係數及迴歸模型的統計特性外，更利用所建立之 Logistic 迴歸模型，作為推估流域空間崩塌發生機率。據此，本研究將研究區域的崩塌潛感區分為「低潛感」、「中潛感」、「高潛感」、「極高潛感」等四個等級，由推估的結果可看出，雖然「高潛感」及「極高潛感」崩塌潛感的區域面積相對於其他等級來得小，但由崩塌潛感來看，其與實際調查的崩塌分布已相當地吻合。

關鍵詞：Logistic 迴歸、崩塌潛感圖。

The Application of Logistic Regression for Landslide Susceptibility Mapping in the Jhuoshuei River Basin

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ABSTRACT　　The purpose of this paper is to produce a landslide susceptibility map in the Jhuoshuei River basin of Central Taiwan using logistic regression. In susceptibility mapping, logistic regression is used to find the best fitting equation to describe the relationship between the odds of landslides occurring and a set of independent parameters such as slope angle, aspect, elevation, lithology and river network. The inventory map in the study area including 5355 landslides investigated in 2003 was used to produce a dependent variable, which takes a value of 0 for the absence and 1 for the presence of slope failures. In the logistic equation, the corresponding coefficient for each parameter could be interpreted as the effect of those on landslide occurrence. In addition to the model statistics and coefficients, the final result of the regression process is a predicted map of probability constrained to fall between 0 and 1. Using the predicted map of landslide probability, the study area was classified into five categories of landslide susceptibility, namely low, medium, high and very high. Although the proportion of high and very high susceptible zones was far smaller than others, the resulting map supported the observation that landslides are more common in the

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Jhuoshuei River basin.

Key Words: Logistic regression, landslide susceptibility map.