

## 石門水庫集水區的山崩與輸砂量在不同颱風事件中之相對應關係

## The relationships between landslide and sediment discharge in different typhoon along the watershed of Shimeng reservoir

袁承偉 Cheng-Wei Yuan

## 摘要

石門水庫之上游集水區在歷經 1996 年賀伯颱風、2001 年桃芝颱風、2004 年艾利颱風，以及 2005 年馬莎颱風等四個事件後，山崩的新生率逐次從 92% 下降至 46%，山崩的再現率則逐次從 19% 上升至 53%，其中山崩的類型大致是以小於 2000m<sup>2</sup> 之小規模山崩為主。從山崩最低點集水區的機率分佈發現，經過這四次颱風事件後，崩塌材料堆積於山坡上的比例介為於 77% 至 94% 之間。發生山崩的坡度大部分介於 30° 至 50° 之間，比例介於 69% 至 76% 之間。從崩塌的統計分析發現，大部份的山崩主要集中於澳底層、大桶山層和乾溝層等三個地層中，佔總集水區崩塌總面積之 90% 以上。

在河流輸砂量的統計方面，石門水庫上游從 1980 年至 2004 年之平均年輸砂量為 13.7 百萬噸。各颱風事件的總輸砂量則以艾利颱風期間的 2.5 百萬噸為最高，是賀伯颱風期間 1.6 百萬噸輸砂量的 1.6 倍。若將艾利颱風期間匯入石門水庫入水口之 1.5 萬 ntu 的濁度，相對於於石門水庫取水口量測的 12 萬 ntu 濁度的比較，此結果顯示石門水庫的原水濁度可能與庫區內之沉落底層之懸浮沉積物有密切關係。

**關鍵詞：**石門水庫、山崩、輸砂量、颱風

## Abstract

After the catchments of Shimeng reservoir go through typhoon Herb, typhoon Toragi, typhoon Aere, and typhoon Matsa, the newborn landslide rate dropped to 46% from 92%, the reactive landslide rate increased from 19% to 53%. The type of landslide is mainly on smaller landslide which less than 2000m<sup>2</sup>. Probability distribution in upslope area at the lowest spot reached by landslide shows that there are materials of 77% and 94% accumulate on the hillslopes after four typhoon event. Most of landslide happened on the area that slope between 30° to 50°, the probability between 69% to 76%. from the statistical analysis of landslide, we found that most of landslide concentrated on Aoti formation, Datongshan formation, and Gangou formation, More than 90% of whole landslide area in the watershed of Shimeng reservoir.

The sediment discharge from 1980 to 2004 of the catchments of Shimeng reservoir is 13.7 Mt/yr. In four typhoon event, The sediment discharge during typhoon Aere is 2.5 Mt/yr which is 1.6 times of 1.6 Mt/yr during typhoon Herb. The turbidity during typhoon Aere is 1.5 ten thousand ntu that transform sediment discharge, and the turbidity that field survey in Shimeng reservoir is 12 ten thousand ntu. After compare with each other, result shows that The turbidity in Shimeng reservoir has a great relationship to the sediment in the bottom of reservoir.

**Key words:** Shimeng reservoir, landslide, sediment, typhoon