

摘要

在氣候變遷的影響下，極端氣候發生頻率有增加之趨勢，而臺灣屬於多種天然災害可能衝擊之地區，其中以淹水、土石流及地震災害為最常發生之事件，如地震所引起之土石鬆動，一旦發生降雨便易引發土石流，危害人民生命財產安全。而災害之發生極其快速，如何即早預判，提供災害防治之應變處理，將是重要的課題。

目前在土石流災害預警上，乃是採用土石流觀測系統，其利用土石流發生時所發出之警報，告知下游民眾即刻撤離，但目前所使用的鋼索檢知器、地聲檢知器及紅外線攝影機，皆屬於事發型的土石流觀測系統，可應變時間較短。本研究期以逕流歷線預警系統之應用，即早發現土石流發生之潛勢，以求增加預警之時間。

為此，首先彙整前人相關研究，對現行之土石流觀測系統進行探討，再與逕流歷線預警系統比較，探討該預警系統建置之可行性。並以動態降雨-逕流模式應用於旗山溪楠峰橋集水區，經分析結果顯示，該系統之應用可提供對於土石流發生時機之研判，將有助於集水區土石流警報之發布；而未來對土石流之預警更應朝向即早預判之方式，並將傳統式觀測及逕流歷線預警系統進行整合，將可有效提供相關單位對於災害應變之處理時機，減少土石流致災之損失，並有利人員撤離與疏散之相關因應措施處理。

【關鍵詞】 極端氣候、逕流歷線、土石流、預警系統

ABSTRACT

Due to the influence of climate change, occurrence frequency of extreme weather shows an increasing trend. Taiwan is vulnerable to several natural disasters such as landslide, floods, debris flow, and earthquake. Rainfall and/or earthquake could easily induced landslides and trigger debris flow, which threaten the safety of properties and human beings rapidly. How to predict disasters in advance and establish disaster prevention response is crucial.

Nowadays, the debris flow observation systems are mostly adopted as the warning system to alarm the residents of downstream area to evacuate in advance while encountering the disaster of debris flow. The devices current used, such as wire sensor, geosound sensor, and infrared cameras are classified as the post-event type sensor, which only has a shorter response time, and can just hardly satisfy the requirement which people expect from precaution system. To predict disasters earlier and increase response time, the runoff hydrograph will be applied for early warning systems in this study.

The references of related previous studies and the currently used debris flow observation systems are collected and explored to compare with the warning system established using runoff hydrograph model which is applied in Chishan River catchment Nan Feng Bridge with dynamic rainfall - runoff model. The results show that the model can be applied as a debris flow event prediction and warning system. The system developed in this study has been improved for a longer response time by integrating traditional observation system and runoff hydrograph warning systems and can provide to the references of related authorities.

【Keywords】 Extreme weather, Runoff hydrograph, Debris flow, Warning system