

應用雷達定量降雨與路面淹水感測器於淹水模擬之應用

沈志全¹ 張哲豪² 許至璵³ 吳祥禎⁴ 徐志宏⁵ 莊賢達⁶ 劉敏梧⁶
方圖科技股份有限公司¹ 國立台北科技大學² 國家高速網路與計算中心³ 國立聯合大學⁴
巨廷工程顧問有限公司⁵ 經濟部水利署水利規劃試驗所⁶

摘要

隨著短延時強降雨事件與極端降雨事件的不斷發生，傳統透過工程方式進行流域集水區與都市排水的治理工程在不斷提高保護標準下，仍無法避免短暫積淹水事件的發生。因此有效了解淹水事件發生的歷程與變化。將有助於未來透過非工程方式與結合在地滯洪應用，降低淹水對於人民的影響範圍與影響時間。而淹水事件原因是在流域集水區範圍內降雨量，超過排水系統可以負荷的體積與流量而產生積水或淹水。上述工程方法與非工程方法都需要有效透過淹水模擬重現不同淹水歷程的變化，才能有效評估應用不同方案可能產生的影響。

而重現淹水歷程中最重要資訊分別為降雨量的時間與空間分布與淹水的歷程紀錄。為了有效了解流域集水區降雨量的空間分布資訊。應用氣象局與水利署與水保局合作的QPESUMS系統之雷達定量降雨產品，改善以往透過雨量站方式進行推估過程中雨量測站之間變化的不確定。而淹水歷程中淹水深度與淹水範圍，以往只能由事後淹水調查或透過民眾回報方式進行紀錄。隨著資訊科技不斷進步目前可以透過路面淹水感測器進行完整的淹水歷程記錄。有助於提升目前淹水模擬的準確度與正確性。本文將說明目前應用雷達定量降雨量與路面淹水感測器在淹水模擬之成果。並且針對資料雷達定量降雨量與路面淹水感測器資料現況與問題，提出在淹水模擬過程中需要注意的內容，並且針對資料使用上提出可行的建議方案與方式。

關鍵字：雷達定量降雨、信心度、水文分析應用、流域、集水區

Application of Quantitative Precipitation Estimation and IoT Flood Sensor in Flood Simulation

Jih-Cyuan Shen¹ Che-Hao Chang² Chih-Tsung Hsu³ Shiang-Jen Wu⁴ Chih-Hung Hsu⁵
Sian-Da Jhung⁶ MIN-WU LIU⁶

FondUS.inc¹ National Taipei University of Technology² National Center for High-Performance Computing³
National United University⁴ GT International⁵ Water Resources Planning Institute⁶

Abstract

With the continuous occurrence of short-duration extreme rainfall events, the traditional engineering approaches to urban drainage cannot prevent the occurrence of short-term flooding events even though the flood protecting standard is constantly being raised. Therefore, an effective understanding of the history and variation of flooding events will help us understand the flooding. This will help to reduce the extent and duration of the impact of flooding on people in the future through non-structural measures in flood management. Heavy rain trigger floods in low-lying areas that exceed the capacity of volume and flow of the drainage system. Both structural and nonstructural measure approaches need to effectively reproduce the variation of different flooding through flood model in order to effectively assess the possible impacts of applying different options.

The most important information in reanalysis the flooding events is the temporal and spatial distribution of rainfall and the high-water marks. In order to understand the rainfall of temporal and spatial distribution in the catchment. Applying the QPESUMS rainfall data that the value calibrates by rain gauges. Traditionally, the depth and flooding area in the flooding could only be recorded by high-water marks surveys or the emergency operations center report. With the advancement of IoT technology, right now possible to record complete flooding through an IoT flood sensor. It helps to improve the accuracy and correctness of the flood simulation. This article will explain the results of the current application of QPESUMS QPE rainfall and IoT flood sensors in flood simulation. And that content that needs to requires attention in the flood simulation.

Keywords: Quantitative Precipitation Estimation, IoT flood sensor, flood simulation data quality