

## 改良式水筒模式於坡地旱田之降雨 - 逕流研究

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**摘 要** 台灣地狹人稠，往山坡地發展是不可避免的趨勢。發生豪大雨的時候，山坡地的洪水逕流量和洪峰流量顯著增大，坡地逕流歷線也跟著改變，使得原有的排水系統無法負荷，造成臨近邊緣區域以及其下游地區存在水患增大的威脅。

為掌握坡地逕流量大小的問題，本研究將以有較佳水文模擬之水筒模式做基礎，並簡化成爲旱田水筒模式，另對照坡地逕流具有良好模擬效果之運動波模式，初步探討兩者對坡地逕流模擬的表現。選定位於台中盆地內之坡地旱田試驗區爲研究區，並選定兩場降雨事件作模擬研究，以 5 種指標—均方根誤差（RMSE），效率係數（CE），洪峰誤差百分比（EQ<sub>p</sub>），洪峰到達時刻誤差（ET<sub>p</sub>），總體積誤差百分比（EV）等作模擬結果評估，整體上兩種模式都有不錯之適用性，惟以運動波模式之洪峰到達時間誤差較小，對洪峰模擬性較佳。

**關鍵詞**：水筒模式、運動波模式、模擬。

## Application of Improved Tank Model on Upland Field Rainfall-Runoff Research at Hillslope

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**ABSTRACT** Taiwan is a small island. Since the utilization of useful plain area has reached capacity, the development of hillsides has been an inevitable trend in recent years. During stormy seasons, especially when typhoons occur, huge rainfalls always bring heavy precipitation and the peak of rainfall is difficult to estimate. Simultaneously, when the amount of hydraulic and surface rainfall increases rapidly, the drain systems will not bear the burden. That will threaten the people who live near and downstream areas of hillside.

This research is based on the tank model, which is the best for hydrologic simulation and has been simplified to the Dry-tank model, and the kinematic wave, model, which is the best for upland rainfall simulation. Then, we apply both models to study the relationship and effect in rainfall and upland simulation. We selected the Tai-Chun basin as the test area, and two natural rainfall events occurred in the test area to be a practical example to examine the both models. Finally, the following

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5-indexes – RMSE (Root mean squared error), #CE (Coefficient of efficiency), #EQp (Percent error of peak discharge), #ETp (Error of time to peak), and #EV (Percent error of total volume) were applied to evaluate the results of simulation. Consequently, the two models are both applicable, but ETp index resulting from kinematic wave model is smaller than that from Dry-tank model.

**Key Words:** tank model, kinematic wave model, simulation.