

運用類神經網路建立紋溝間土壤沖蝕推估模式之研究

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摘要 影響紋溝間土壤沖蝕之因子多半具有地域性,有時完全引用國外所發展之土壤沖蝕推估模式並不恰當。因此,本土化之土壤沖蝕推估模式亟待建立。國內在紋溝間土壤沖蝕推估模式的建立上,係以室內人工降雨沖蝕試驗為基礎,運用回歸分析方法,以求得推估公式。惟各因子與土壤沖蝕量存在著複雜的非線性關係,其擬合模式假設困難,部分預測模式之適用性與準確性不佳。本文蒐集整理了國內近十年之人工降雨沖蝕試驗結果,藉由類神經網路所具有的自我組織、自我學習及平行分散處理之能力,建構紋溝間土壤沖蝕之類神經網路推估模式,並綜合國內重要的推估公式,進行分析比較。研究發現類神經網路不僅有較佳的推估能力,模式之建構力強及適用性廣。

關鍵詞 : 紋溝間土壤沖蝕、回歸分析、人工降雨、沖蝕試驗、類神經網路。

Application of Artificial Neural Network to Evaluating Model of Interrill Soil Erosion

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ABSTRACT Some of the factors affecting interrill soil erosion may have local characteristics. Sometimes, the soil erosion evaluation models developed in other countries cannot be applied. Therefore, it is necessary to establish a local soil erosion evaluation model. In Taiwan, when establishing the interrill soil erosion evaluation model, erosion tests using simulated rainfall and regression analysis were used to develop the evaluating equations. However, the relationships among the factors and soil erosion rate are complicated and non-linear. Thus, their assumptions for the fitting model are quite difficult, and some of the models developed from this approach are neither applicable nor accurate. In this study, the interrill soil erosion test results were obtained from simulated rainfall in the past 10 years in Taiwan. Through the functions of self-organization, self-learning and the ability of parallel processing of artificial neural network, the interrill soil erosion evaluation model was established. In addition, some of the interrill soil erosion evaluating models developed in Taiwan were also compared. It is found that the models established using artificial neural network provide better evaluation and are more applicable.

Key Words: interrill erosion, regression, test of rainfall-simulator, soil erosion, artificial neural network.

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