基于前期土壤含水量模型的陇南武都区降雨诱发型滑坡降雨阈值研究

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摘要：

本研究利用土壤前期含水量模型（Glade 等，2000），利用建立的降雨诱发型滑坡样本数据库，对武都区降雨诱发型滑坡降雨阈值进行了研究，研究结果表明，土壤前期含水量模型对建立区域尺度降雨诱发型滑坡的早期预警，具有潜在的意义，为我国建立国家、省、市各级滑坡实时预报系统提供范例，为减少滑坡灾害损失提供科学与技术支撑。

研究实验样区甘肃省武都县位于甘肃省东南部，地处秦岭山系，介于青藏高原、黄土高原和四川盆地三大地貌单元之间，位于西秦岭纬向构造带与武都"山"字型构造体系交汇处，地层破碎，有近 1/3 地区被黄土覆盖，地质构造活动强烈，地震活动频繁，地质灾害的发育程度、爆发频率、发生规模和危害、威胁程度均居全国之首。长时间的降雨和暴雨是武都滑坡发生的重要条件。据统计，95%的滑坡发生在当年的雨季，60%以上的滑坡发生在丰水年的雨季。20 世纪 80 年代以后的滑坡几乎都集中在 5-9 月暴雨之后。

关键词：降雨，Logistic 回归模型，有效前期降雨，滑坡预测，陇南

Prediction of rainfall-induced landslides using the soil water status model

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Abstract:

The relationship between rainfall and landslide is very complex. Great efforts have been made on the study of regional rainfall induced landslides forecasting models in recent years. There is no commonly accepted method for rainfall-induced landslide prediction available. The previous study models can be divided into three major categories: The actual rainfall approaches (intensity, amount, and duration of rainfall), concepts including antecedent conditions and models also considering environmental settings, e.g. the soil water status model (ASWM).

In this paper, a quantitative method based on historical landslide data, effective daily rainfall, antecedent conditions and selected environmental settings is proposed. Data from the Longnan region are explored and landslide-triggering rainfall thresholds are determined. Antecedent conditions are considered using the decay function of soil drainage. Results show, that this concept has the potential to be applied to rainfall forecasts in order to forecast the probability of landslides for the forecasted period.

Key words: rainfall; Logistic regression model; effective antecedent rainfall; landslide prediction; the Longnan area

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