

Forecasting of the Mobility of Rainfall-Induced Slow-Moving Landslides Using a Two-Block Model

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Abstract : The present study deals with the landslides periodically reactivated by groundwater level fluctuations owing to rainfall. The main type of movement which generally characterizes these landslides consists in sliding with quite small-displacement rates. Another peculiar characteristic of these landslides is that soil deformations are essentially concentrated within a thin shear band located below the body of the landslide, which, consequently, undergoes an approximately rigid sliding. In this context, a simple method is proposed in the present study to forecast the movements of this type of landslides owing to rainfall. To this purpose, the landslide body is schematized by means of a two-block model. Some analytical solutions are derived to relate rainfall measurements with groundwater level oscillations and these latter, in turn, to landslide mobility. The proposed method is attractive for engineering applications since it requires few parameters as input data, many of which can be obtained from conventional geotechnical tests. To demonstrate the predictive capability of the proposed method, the application to a well-documented landslide periodically reactivated by rainfall is shown.

Keywords : rainfall, water level fluctuations, landslide mobility, two-block model

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