



Physically based modeling of the origins of rainfall intensity-duration landslide triggering thresholds

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A successful framework for predicting rainfall-induced landslide triggering is based on prescribed thresholds that consider rainfall intensity-duration relations. These thresholds have been used for post-event analyses or for devising early warning criteria. Often these thresholds are site specific and show dependency on antecedent rainfall events. We seek to systematically study the physical basis that underlies the intensity-duration relationships using a recently developed STEP TRAMM modeling platform. The STEP-TRAMM combines a threshold mechanics model with hydrological considerations to model localized landslides at a catchment scale and it uses publically available DEM, soil and precipitation data that makes it applicable to any catchment globally. We have used the framework to model landslide triggering in several catchments around the globe using soil, cover and site specific rainfall information and thresholds. The initial wetness conditions (prior rainfall sequence) and rainfall intensity-duration were varied systematically to capture landslide characteristics over the catchments under study. Simulated rainfall intensity-duration thresholds and landslide characteristics will be compared with empirically-deduced intensity-duration functions based on field observations.