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Toward and assessment of climate change impact of landslide occurrence in Central Italy through physically-based approaches.

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Landslides are one of the most dangerous and widespread natural hazards that cause every year loss of human life and damage to properties. Nowadays, many approaches and models with the purpose to assess landslide hazard are available. Besides the evaluation of the occurrence of landslide over an area, these models can be used with benefits to assess the effect of climate change on this kind of natural hazard, in order to mitigate the impact.
In this study, the Transient Rainfall Infiltration and Grid-Based Regional Slope-Stability model (TRIGRS) has been used to assess the variation in landslide occurrence in Central Italy. The rainfall projections of 6 Regional Circulation Models (RCMs) were downscaled and weather generators were used for obtaining hourly rainfall time series from daily RCMs raw data. Then, TRIGRS was employed to evaluate the stability conditions over the analysis area during three different periods (1988-2005 as baseline, 2040-2069 and 2070-2069). For each rainfall projection and for each temporal horizon, a rainfall event characterized by a return period of 5, 10, and 50 years of daily rainfall is built and used to drive the model. The variation in the number of unstable grid cells between present and future periods is considered to assess the impact of climate change on landslide occurrence. Preliminary results showed that the effects induced by the expected climatic trends are well reproduced by the physically-based model, providing a worsening of the stability conditions when more severe climatic conditions are considered to drive the model.