Landslide triggering modeling in Switzerland

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Switzerland is prone to hazard interactions due to its mountainous landscape. Historical earthquakes are known to have triggered aftershocks, landslides, rock falls and avalanches, as well as lake tsunamis. Here we present a simple cellular automaton to simulate landslide footprints triggered by both rain and earthquakes. The method is based on the Sandpile model, which dynamics is controlled by the ground slope. Rain levels are approximated by ground water saturation and earthquake-landslide triggering is evaluated using the concept of Newmark displacement. That concept is then modified to estimate stable slopes during shaking at which locations the landslide stops. The cellular automaton is first tested in a virtual region where a parameter sensitivity analysis is made. Then it is tested in a region of Switzerland, where historic landslides triggered by earthquakes are known to have occurred.