DID EARTHQUAKES TRIGGER LANDSLIDES IN THE BONN AREA?

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Landslides are recognized and mapped worldwide. Often, no information on the trigger of fossil landslides, either recently active or inactive, is available. However, natural landslide triggers are mainly earthquakes or rainfall and soil moisture. In contrast to numerous concepts and methods for rainfall-triggered landslides on both local and regional scale, techniques for modelling earthquake-triggered landslides are rare.
In the Bonn area, landslides have been investigated over the last decades. The main focus was on mapping landslide distribution, measuring current movement patterns, and modelling landslide stability. Although conceptually addressed previously, systematic analysis on earthquakes as triggers for landslides is missing for the Bonn area. This study uses for site specific analysis a model originally developed for soil liquifaction. Based on the assumption that a liquifaction of a slope segment causes a landslide, this model was used for impact scenarios of historically known earthquake magnitudes for a detailed site. Historical earthquakes were applied for regional analysis. On this scale calculated earthquake intensities were compared with the distribution of landslide. Both analysis show, that earthquakes have the potential to initiate first landslide failures in the Bonn area.