Near-Real-Time Ground Failure Estimates: A New USGS Real-time Earthquake Product

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We present a newly-developed USGS product that provides quantitative estimates of the severity and extent of earthquake-triggered landslide and liquefaction hazards in near-real-time for significant earthquakes worldwide. We anticipate that this product will be helpful for situational awareness and response efforts. The product is integrated with the existing suite of USGS real-time earthquake products. The algorithm receives shaking estimates from ShakeMap and provides outputs consistent with direct use by the USGS loss estimation products (PAGER and ShakeCast) and downloadable in standard GIS formats for other purposes. The summary webpage consists of interactive maps displaying preferred and alternative models for each ground failure type along with summary statistics, providing a basis for direct comparison between differing models and different triggering events. Optional alert levels based on the estimated hazard and population exposure can be used to rapidly identify earthquakes for which one or both of these ground failure hazard types may present a significant concern. The maps may be particularly useful when direct observations of ground failure are not possible due to time-of-day, weather conditions, or remote and rugged terrain. The product may also be applied to analyze significant past or future ("scenario") earthquakes. This initial product provides the base upon which we aim to build more sophisticated ground failure models and derivative products. Continued evaluation of models against recent datasets is required, as is iterative evaluation of the product presentation based on both peer and user feedback. Ongoing research and development includes (1) interpreting ground failure probabilities in the context of rapid ground failure estimation using satellite image decorrelations, and (2) incorporating more site-specific geotechnical constraints in the place of the global proxies for which the models were calibrated.