

Developing tools for landslide risk reduction across the U.S.: from hydro-meteorological thresholds to continental-scale susceptibility assessments

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Abstract.

Landslides are damaging, disruptive, and deadly. Two important tools to reduce the impact of landslides on society are (1) landslide early warning systems, which are used to forecast *when* landslides are likely within a given area, and (2) landslide susceptibility maps, which show *where* landslides are likely across an area of interest.

Landslide early warning systems are often based on thresholds with the assumption that the longer or harder it rains, the more likely landslides will be triggered by a given storm event, which ignores the role of antecedent wetness conditions. However, our Hillslope hydrologic monitoring in landslide prone terrain across the U.S. reveals some important gaps in our theoretical understanding of subsurface processes from rapid near-surface hydrological responses to the seasonal and annual “memory” of previous precipitation.

Landslide susceptibility maps are typically developed on the assumption that landslides happen under similar conditions where they have in the past; this creates a challenge in data sparse regions where landslides are possible but have not been mapped. We use a parsimonious approach to develop an improved, uniform susceptibility map with high-resolution coverage over the entire U.S., including Alaska, Hawaii, and Puerto Rico.

This presentation will tour several noteworthy monitoring sites across the U.S. to show the wide variability in landslide types and triggering conditions for developing hydro-meteorological thresholds, then it will describe the process of developing a simple, but robust map of landslide potential for the entire country.

Ben Mirus is a Supervisory Research Geologist with the U.S. Geological Survey's (USGS) Landslide Hazards Program at the Geologic Hazards Science Center in Golden, Colorado. Ben earned his Bachelors degree in geology from Pomona College and a PhD in Hydrology at Stanford University. He started his career at the USGS as a student intern and then postdoc in California, then he then served on the faculty at University of North Carolina at Chapel Hill before returning to the USGS in Colorado in 2015. In his current role, Ben leads a growing team of scientists and postdocs and applies his background in geology, hillslope hydrology, and numerical modeling towards developing new tools and insights for landslide hazard assessment and loss reduction.

