

Climate change to have 'little effect' on common landslides

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The frequency of common landslides is not likely to increase as a result of more rainstorms brought about by future climate change, new research from Cardiff University has shown.

Experts at the School of Earth and Ocean Sciences have shown that while the [frequency](#) of rainstorms may increase by up to 10% according to climate change projections, this would produce a long-term increase in shallow landslide frequency of less than 0.5%.

Shallow landslides are the most common type of landslide and are often caused by heavy rainfall. They occur through the collapse of soil, resulting in fast moving debris flows of rock and mud that present a very dangerous hazard to anything in their path.

The new findings, which have been published in the journal *Scientific Reports*, challenges current theories within the field which suggest that landslide activity could increase proportionally with increased rainfall.

Instead, the research findings show that the triggering of landslides is much more dependent on the build-up of soil – otherwise known as colluvium – on steep hillslopes, as opposed to rainfall from storms.

The research team arrived at their results by performing field investigations in the Southern Appalachian Mountains, specifically looking at how the time taken for soil to accumulate on hillslopes affected the landslide triggering rate. The team then used computer

models to calculate how future landslide hazards may develop as a result of climate change.

According to the researchers, shallow landslides occur when soil slowly accumulates on a mountainside over a very long time period, from thousands to tens of thousands of years. During a storm, converging ground water flow and the infiltration of rain into the colluvium causes landslides to be triggered.

It then takes thousands of years for soil to accumulate once again on the mountainside before a landslide can occur again, so an increase in the frequency of storms during this time would have little effect on the frequency of landslides.

Lead author of the study Dr Rob Parker, from Cardiff University's School of Earth and Ocean Sciences, said: "Our results have shown that lots more storms result in very few extra landslides. Though observations tell us that heavy rainfall triggers landslides, it is the process of soil accumulation that happens in the thousands of years leading up to a landslide that can be really important in determining how often landslides occur.

"Though we still expect shallow landslides to continue to be a major hazard in our future wetter climate, we do not expect the frequency of landslides to increase in proportion to the frequency of extreme precipitation events."

"Landslides pose a major hazard to life and infrastructure, affecting around 12% of the world's population who live in mountain ranges," Dr Parker continued.

"In addition to the direct hazard they pose, landslides are the primary source of sediment in mountain ranges, with significant knock-on effects

on river, floodplain and estuarine systems, as well as playing an important role in global biogeochemical cycles.

"The consequences of landslides are therefore wide-reaching, so it's vital that we get a better understanding of how they may evolve under future climate conditions."

More information: Robert N. Parker et al. Colluvium supply in humid regions limits the frequency of storm-triggered landslides, *Scientific Reports* (2016). [DOI: 10.1038/srep34438](https://doi.org/10.1038/srep34438)

Provided by Cardiff University

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