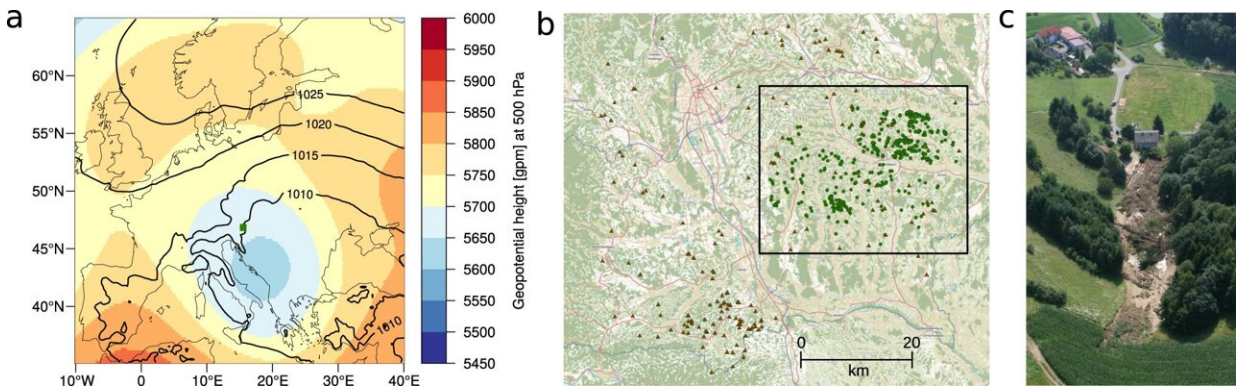
Simulating the possible ways global warming could impact landslides in the Austrian Alps

April 11 2022, by Bob Yirka



Meteorological and landslide event of 2009. **a** Mean large-scale circulation during 22–26 June 2009 over Europe derived from IFS operational analysis. Sea level pressure (contours, hPa) and geopotential height at 500 hPa (shading, gpm). **b** Map (region marked as green rectangle in a) of actual landslides recorded during the 2009 event (green; 2014 landslides additionally used to calibrate the landslide model are marked in brown. See Methods for detail). The target region (roughly coinciding with the Feldbach district and referred to as Feldbach region in the following) considered for the landslide assessment is shown as black rectangle (Supplementary Fig. 1). Map © OpenStreetMap contributors. **c** Aerial view of a landslide occurring during the event. Credit: State of Styria. Credit: *Communications Earth & Environment* (2022). DOI: 10.1038/s43247-022-00408-7

A team of researchers from Austria, Germany, Italy and the UK has created simulations aimed at showing possible landslide scenarios in the

Austrian Alps in the coming years as global warming leads to changes in the weather there. Their paper has been published in the journal *Communications Earth and Environment*.

In June 2009, a three-day rain event over Austria led to flooding in northern parts of the country and multiple landslides in the southeast. The researchers note that in just one district, there were more than 3,000 landslides. The large number of landslides raised alarms throughout the country as some worried that such events may become more common under climate change. In this new effort, the researchers created simulations to show possible landslide scenarios in the coming years as the planet grows warmer.

As with most other recent simulation efforts, the researchers began with three major scenarios in mind—a worst case situation where the planet warms by 4 degrees Celsius, an intermediate situation where the planet warms by 3 degrees Celsius, and an optimistic situation where warming is held to just a 0.5 degrees Celsius increase. But they also tried account for other factors such as the impact of warmer air in the region where the prior landslides had occurred. They noted that more rain would obviously mean more landslides, and that they would likely occur over a larger part of the area under study. But they also noted that if rainfall amounts remained the same as today, or decreased, there could be fewer landslides because warmer air would lead to more evaporation of moisture from the soil.

The simulations showed that in the worst-case scenario, more rainfall could occur over a wider area—one 45% larger than the area impacted in 2009. But it also showed that drier air could result in fewer landslides or they could occur in a smaller area. Under intermediate conditions, the simulations showed more rainfall events that impact a smaller area, resulting in overall drier soil, suggesting fewer landslides. And under the most optimistic scenario, the simulations showed conditions similar to

those of today.

The researchers also noted that changes in vegetation could have a big impact on landslides—planting lots of deep-rooted trees, for example, could dramatically reduce the number, size and frequency of landslides.

More information: Douglas Maraun et al, A severe landslide event in the Alpine foreland under possible future climate and land-use changes, *Communications Earth & Environment* (2022). DOI: 10.1038/s43247-022-00408-7