



Predictability of landslide timing from quasi-periodic precursory earthquakes

Andrew Bell

University of Edinburgh, School of GeoSciences, Edinburgh, United Kingdom (a.bell@ed.ac.uk)

Accelerating rates of geophysical signals are observed before a range of material failure phenomena. They provide insights into the physical processes controlling failure and the basis for failure forecasts. However, examples of accelerating seismicity before landslides are rare, and their behavior and forecasting potential are largely unknown. Here I use a Bayesian methodology to apply a novel gamma point process model to investigate a sequence of quasi-periodic repeating earthquakes preceding a large landslide at Nuugaatsiaq in Greenland in June 2017. The evolution in earthquake rate is best explained by an inverse power-law increase with time towards failure, as predicted by material failure theory. However, the commonly accepted power-law exponent value of 1.0 is inconsistent with the data. Instead, the mean posterior value of 0.71 indicates a particularly rapid acceleration towards failure, and suggests only relatively short warning times may be possible for similar events in future.