

Characteristics of Precursory Seismicity Associated With Landslides
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We present seismic signals associated with landslides, many of which show characteristic patterns of microseismicity within hours of failure. Events of this nature have been observed in at least five locations: (1) on Mt. Baker (Washington) during an ice avalanche in 1976 (Weaver and Malone, 1979), (2) repeatedly on Iliamna volcano (Alaska) in association with glacial avalanches (Caplan-Auerbach and Huggel, 2007), (3) on Mt. Stellar (Alaska) prior to a 2006 rockfall (Huggel et al., 2010), (4) in 2015 prior to two events comprising the Rausu landslide (Japan; Yamada et al., 2016), and most recently (5) in Nuugaatsiaq, Greenland, where a landslide fell into a fjord, generating a lethal tsunami (Poli, 2017). In all cases the precursory events exhibited waveform similarity, indicative of a repeating point of failure. We interpret these events as stick-slip behavior at the landslide base. In most cases, notably the Nuugaatsiaq event and the Rausu slides, the precursory events occur at shorter intervals prior to failure. In some cases this characteristic could allow prediction of the failure time, as the inter-event time approaches zero. In other cases, however, such as the 1994 Iliamna slide, there is no clear trend in event timing, or events occur well before failure. This poster characterizes the different seismic sequences, investigating the timing, amplitude, and waveform similarity of the precursory sequences. We compare these observations with other known parameters such as the type of failure, the material in which failure took place, and the possibility of triggering events.

