Ambient seismic noise monitoring of active landslides and rock columns prone to failure

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Ambient seismic noise can be used to monitor the integrity of unstable slopes and rock columns prone to failure. To that end, we record continuously seismic waveforms in the fields using 1D or 3D short period seismic sensors together with autonomous and telemetered data loggers that can be operated in severe environmental conditions. When monitoring landslides made of unconsolidated materials (such as clay), we propose to monitor the relative seismic velocity changes using the Coda Wave Interferometry technique operated on the coda of daily ambient seismic noise correlations (Passive Image Interferometry). When monitoring the rupture of a rock column, we propose to track the evolution of the polarization and natural frequencies of the first resonant modes of the structures. In both cases, experimental results suggest potential precursory signals some days before the failure. We also observe a clear dependence of the seismic properties of the soil and environmental conditions such as temperature and hydrology.

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