Seismic records for searching fore- and afterslides of gravitational mass movements

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Environmental seismology is an emerging field with strong implications for better understanding and mitigating natural hazards. Continuous real-time records of seismic stations allow the precise detection of rapid gravitational mass movements such as rockfalls and landslides on various scales – from local slope monitoring to regional or global detection of large-scale events. Especially when compared with classical detection methods for wide-area coverage, such as remote sensing, seismology has the advantage of providing continuous records with precise time stamps. The seismic waves generated by rapid mass movements enable us to study e.g. repeated failures of a slope with a temporal resolution opens up new possibilities: E.g. we can discriminate subsequent events from the same source region, such as potential foreslides and afterslides, which might otherwise be registered as just a single failure, or with insufficient timing precision. In this study we analyze seismic records obtained from permanent and temporary seismic networks in the Alps and search for fore- and afterslides around the catastrophic 2017 Piz Cengalo, Switzerland rockslide and a series of rockfalls in the Glockner Group, Austria that have occurred in October 2017.