

Study of mass movements from a seismological point of view (1995-2017)

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Since 1995 our group has been investigating the seismic signals generated by snow avalanches with the aim of detection using the information in the time and frequency domains (Sabot et al., 1995). Once the reproducibility and repetitivity of the avalanche seismic signals were demonstrated, the use of these signals for detecting and/or studying avalanche dynamics gains value (Suriñach et al., 2000). It was in 2003 when the time evolution of the frequency content of the signals generated was first considered, and the additional information obtained led us to introduce the term mass movement and to study their development from this point of view (Biescas et al., 2003). Subsequently, different surface mass movements were seismically studied. In 2005 landslides were included, in 2008 and 2014 rock falls and debris flows, respectively, and in 2016 lahars were incorporated into the study (Suriñach et al., 2005; Vilajosana et al., 2008; Kogelnig et al., 2014; Vázquez et al., 2016). Since 2008, the infrasound wave field generated by snow avalanches and by debris flows have been compared with the seismic wave field recorded by the appropriate sensors. Although the term mass movement is a global one, particularities in the seismic signals of each event can be observed. Additionally, terrain, geographical and instrumental conditions determine the characteristics of the seismic signals. Different results of the studies carried out to date are presented, including the limitations due to the transmission of the seismic wave field across imperfect media.

References

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