



## **Automatic identification of alpine mass movements based on seismic and infrasound signals**

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The automatic detection and identification of alpine mass movements like debris flows, debris floods or landslides gets increasing importance for mitigation measures in the densely populated and intensively used alpine regions. Since this mass movement processes emits characteristically seismic and acoustic waves in the low frequency range this events can be detected and identified based on this signals. So already several approaches for detection and warning systems based on seismic or infrasound signals has been developed. But a combination of both methods, which can increase detection probability and reduce false alarms is currently used very rarely and can serve as a promising method for developing an automatic detection and identification system.

So this work presents an approach for a detection and identification system based on a combination of seismic and infrasound sensors, which can detect sediment related mass movements from a remote location unaffected by the process. The system is based on one infrasound sensor and one geophone which are placed co-located and a microcontroller where a specially designed detection algorithm is executed which can detect mass movements in real time directly at the sensor site. Further this work tries to get out more information from the seismic and infrasound spectrum produced by different sediment related mass movements to identify the process type and estimate the magnitude of the event. The system is currently installed and tested on five test sites in Austria, two in Italy and one in Switzerland as well as one in Germany. This high number of test sites is used to get a large database of very different events which will be the basis for a new identification method for alpine mass movements. These tests shows promising results and so this system provides an easy to install and inexpensive approach for a detection and warning system.