



Localisation of acoustic emission events during loading of snow samples

Klemens Mayer, Ingrid Reiweger, Stephan Simioni, and Jürg Schweizer
WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland

How cracks nucleate inside a snowpack is among the most prominent missing links for fully understanding the release of a dry-snow slab avalanche. Localization experiments using an acoustic emission (AE) setup were carried out in a cold laboratory. The snow samples were monitored with six piezoelectric wide-band transducers. In a first set of experiments, location accuracy was validated by simulating AE events with piezoelectric sparks inside the snow sample. Thereafter, AE events during compression as well as shear tests were localised and interpreted. The snow samples consisted of either one type of snow or several layers including a weak layer. As snow properties affect source mechanics and acoustic wave propagation in snow, samples were characterised in detail. In most cases, AE events were detected with good accuracy. Generally good results were obtained with high density snow. In the layered snow samples, AE activity was concentrated within the weak layer. Strong attenuation remains the most limiting factor for increasing snow sample size to a scale corresponding to avalanche initiation in the field (0.1 - 1 m).