



## Measuring acoustic properties of snow in view of using AE for estimating snow stability

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The acoustic emission (AE) technique is commonly used for non destructive testing of heterogeneous, natural materials such as limestone, wood, or ice. The AE method therefore seems a promising tool for estimating the stability of avalanche prone snow slopes. Two prerequisites for performing acoustic field measurements are the coupling of the AE sensors (ultrasonic range) to the snow and a perception about the acoustic transmission properties of snow. For these purposes we performed laboratory measurements where we recorded an acoustic reference signal (pencil lead fracture) after having travelled through a snow column of 0.4 m height. The best coupling of the AE sensors to the snow column could be obtained by attaching the sensors with silicon to a thin (1 mm) aluminium plate which was frozen onto the snow. Within the frequency range studied (10 kHz - 1 MHz) we found the least attenuation at 30 kHz, suggesting this a suitable frequency for recording AE within snow. The acoustic velocities measured ranged from 290 to 530 m/s, increasing with density. These velocities are close to the acoustic velocity in air, suggesting that for our snow densities (270 to 310 kg/m<sup>3</sup>) the main part (most of the energy) of the AE transmitted in snow travels through the pore space. We used the results of our laboratory measurements to design an acoustic measurement system in the field. In an outlook we present these ongoing AE measurements in an avalanche prone snow slope.