



Measuring acoustic emissions in an avalanche slope

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Measurements of acoustic emissions are a common technique for monitoring damage and predicting imminent failure of a material. Within natural hazards it has already been used to successfully predict the break-off of a hanging glacier. To explore the applicability of the acoustic emission (AE) technique for avalanche prediction, we installed two acoustic sensors (with 30 kHz and 60 kHz resonance frequency) in an avalanche prone slope at the Mittelgrat in the Parsenn ski area above Davos, Switzerland. The slope is north-east facing, frequently wind loaded, and approximately 35° steep. The AE signals – in particular the event energy and waiting time distributions – were compared with slope stability. The latter was determined by observing avalanche activity. The results of two winter's measurements yielded that the exponent β of the inverse cumulative distribution of event energy showed a significant drop (from a value of 3.5 to roughly 2.5) at very unstable conditions, i.e. on the three days during our measurement periods when spontaneous avalanches released on our study slope.