



Vibroseismics in glaciology

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Application of active reflection seismics in Antarctica and on a firn-covered Alpine glacier using seismic vibrators as sources indicate that the vibroseismic technique has several advantages to overcome current shortcomings of explosive seismic sources. The utilized vibrators range from an industrial standard with a peak force of 120 kN in a frequency range of 10-100 Hz to microvibrators with only some 100 N, with a pressure- (30-180 Hz) and a shear-waves (60-360 Hz) version. Most noteworthy advantages of vibrators are their operation from the surface and the basically destruction-free application, allowing for numerous repeated shots at the same position without signal degradation. Comparison of microvibrator data acquired on the firn-covered glacier with those from nonice covered surfaces as well as explosive sources indicates that the data are of very high quality. This is not only attributed to the small employed forces, which keep the structure of the surface firn intact, but to the complete transmission path, yielding a total p-wave penetration depth of some 150 m into bedrock underneath the 60 m thick glacier.